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CHOLECYSTECTOMY. ANALYSIS OF 215 CASES OF GALL-BLADDER DISEASE. OPERATION. END-RESULTS

THE patient is a white female, thirty years of age, who was admitted to the hospital several days ago with a chief complaint of pain in the upper right abdomen. The history shows that three days before her admission she was seized with a sudden pain in the upper right abdomen and a sense of fulness. The pain was intense in character, but did not radiate. It was associated with a gastric flatulence, nausea, but no vomiting. Within a few hours the pain became dull, aching in character, with tenderness over the right hypochondriac area which lasted until her admission into the hospital.

There is no history of colicky pains, jaundice, tarry stools, or constipation, but during the past few years she did suffer from epigastric discomfort, occasional dull pain, and constant belching of gas. Her appetite was poor during the last six months and she suffered from gaseous eructations, but has had no pyrosis. There is nothing in her previous history that would bear any relation to her present illness.

The abdominal examination shows a soft, relaxed lower abdominal wall. Palpation is negative with the exception of the right upper abdomen, where we can elicit a distinct rigidity and tenderness over the gall-bladder area. There is no palpable mass in this region. Her temperature and blood-count are normal. The urine shows a faint trace of albumin, otherwise negative.

The points that I wish to emphasize a great deal in this particular case, which influenced me more than anything else to make a diagnosis of gall-bladder disease, are that for the past few years the patient complained of this epigastric discomfort, dull pain, and constant belching of gas. The history shows that she never had a real attack of colic, but when I questioned her a little more closely on the day of her admission to the hospital I elicited the information that seven years ago, about one week before the delivery of a child, she was seized with an attack of sharp upper abdominal pain, which she called indigestion. She states that she felt a sensation as if the baby was being pushed up toward her diaphragm. The pain lasted about two hours and then gradually subsided. It radiated to the back and she distinctly emphasized the fact that there was no radiation of her pain to the kidney or iliac regions. It was directed toward the right scapula. She had no recurrence of this attack during the last seven years until this present attack. The history of constant belching of gas, dull epigastric discomfort, one sharp attack of pain during the last week of her pregnancy seven years ago, and this last attack of sudden onset of pain previous to her admission to the hospital, associated with the right upper abdominal tenderness, led us to make a diagnosis of gall-bladder disease, which was corroborated by the *x*-ray findings.

QUESTION: Was this a cholecystography by the Graham method?

ANSWER: No, it was a straight visualization, and, as you will see from the plate, the gall-bladder is clearly visualized with a great many stones. We reserve the Graham test method for doubtful cases. We make it our practice to *x*-ray all cases suffering with pain in the upper abdomen, but in view of the fact that we frequently get negative reports in the presence of positive clinical symptoms of gall-bladder disease, we are inclined to accept our clinical interpretation of the patient's symptoms as the operative diagnosis.

Operation.—We will now proceed to make the usual right transrectus incision a little to the right of the midline, and as we open the abdomen we find that the gall-bladder is elongated,

not tense, and contains a great many small, faceted stones. The wall of the gall-bladder is not thickened and appears to be perfectly healthy. There is no exudate covering the gall-bladder and there are very few adhesions between it and the

Fig. 460.—Gall-bladder shadow showing multiple fairly good-sized stones.

adjacent organs. The stomach appears to be normal; there is no evidence of duodenal ulcer. I am now exploring the bile-ducts by introducing my middle finger from the patient's right side into the foramen of Winslow, and keeping my thumb on the left side, palpating the entire length of the common duct and

the lower end of the gall-bladder, and I can safely say that the common duct is perfectly free from any stones, not distended, not thickened. The pancreas is perfectly normal.

QUESTION: What is the character of the liver?

ANSWER: The liver does not appear to be engorged, there is no mottling, no adhesions between it and the parietal peritoneum. It is slightly darker in color and it is easily dislodged. There are only a very few, fine adhesions at the lowermost portion of the gall-bladder which are easily separated.

With a blunt-pointed scissors I am now opening the gastro-hepatic ligament and am isolating the cystic duct, which is easily brought into view. It is always advisable, if possible, to identify and clamp the cystic artery separately. The cystic duct is palpated and traced down to its junction with the common duct. There are no stones within its lumen. Extreme caution must be exercised in this step of the operation not to injure the hepatic or common duct (an unfortunate surgical calamity which has happened once in our experience).

The cystic duct is now clamped with a curved forceps and another forceps is applied at the point of junction of the gall-bladder with the duct. It is then cut across and the gall-bladder is removed from below upward. Before removing the bladder we will make an incision into the serous coat on its under and upper surfaces so that we may be able to dissect it out from its peritoneal fold without injuring the liver. There is very little difficulty in doing this in this case.

I am now using the gall-bladder as a tractor and I am ligating the cystic duct. The cystic artery in this case is tied separately. In applying the ligature to the cystic duct one must be careful not to exert any undue traction on the forceps. The ligature should be slipped across the forceps while it is held in a relaxed position. As you notice, there is no bleeding now, just a little oozing from the serous surfaces. We will now bring together the two peritoneal flaps over the gall-bladder fossa with a continuous catgut suture, and after having completed that, you will notice there is no bleeding and the operative field is perfectly dry.

We are now going to remove the appendix in this case because, in the first place, it appears to be diseased. As you can see, it is bisected in its midportion by a band of adhesions which extends throughout its distal half. It is very accessible and easily removed without adding any appreciable risk to this operation

We are going to close this abdomen with layer sutures without drainage, but before doing this I am going to inspect the gall-bladder fossa to make sure there is no bleeding or leakage of bile.

QUESTION: I want to know if there is any disease in this woman's pelvis.

ANSWER: I am going to explore her pelvis. I do not believe that any harm will be done in this case by exploration, but we are firmly convinced that it is unwise to do any surgery upon the pelvic organs when one does a cholecystectomy. If the appendix is diseased, it is imperative to remove it. It is even advisable to remove a normal-appearing appendix if it is easily accessible, and when the patient's condition is such that it will not appreciably add to the operative risk. Pelvic pathology, however, should be deferred for subsequent treatment. The uterus in this case is freely movable. It is normal in size, slightly retroverted. Tubes and ovaries are normal.

QUESTION: Don't you drain every case of cholecystectomy?

ANSWER: Until three years ago we followed the then universally accepted belief that drainage is essential to a successful outcome in every cholecystectomy operation. However, the tendency at present among some surgeons is against indiscriminate drainage. One can gather from the literature that this so-called "antidrainage" idea is gradually gaining ground.

The arguments against drainage are:

(*a*) The insertion of a drain is conducive to secondary infection.

(*b*) It prolongs the patient's convalescence considerably.

(*c*) It strongly predisposes to postoperative herniæ.

(*d*) Extensive adhesions are much more likely to form at the drainage site than otherwise.

Furthermore, it is argued that if the operative area is thoroughly walled off and kept free from contamination through leakage of bile during the process of removal of the gall-bladder, there is no more indication for drainage than in doing a simple appendectomy.

Those who favor drainage point to the fact that in a number of instances where the wound was closed tight, leaking of bile either from the raw liver surfaces or a defective cystic duct ligature has taken place, resulting in extensive chemical peritonitis with disastrous consequences.

In our own cases during the last two years we find that about 25 per cent. of them were not drained. In the beginning we did that with a certain amount of diffidence, but the postoperative results in the first group of cases convinced us that it is safe not to drain in all cases where there is no acute, inflammatory condition of the gall-bladder present at the time of operation.

We have drained all cases where we had reason to believe that there was some soiling of the peritoneal cavity during the operative manipulation. We have also drained those cases in which we could not carefully peritonealize the raw liver surfaces in the gall-bladder fossa. In those cases there is occasionally a considerable oozing of bile from the liver surface, and some observers claim that there are aberrant bile-ducts which may excrete large quantities of bile that may accumulate in the peritoneal cavity, causing either localized or extensive peritonitis. We cannot find a single instance of either undue morbidity or mortality that can be attributed to this procedure. They all healed by primary union and their duration of stay in the hospital has been considerably diminished. It is too soon to tell whether the incidence of postoperative hernias in these cases will be less than in those where drainage was instituted. We are firmly convinced, however, that in the properly selected cases, if all the necessary precautions are taken to perform a clear dissection and a clean operation, drainage is not indicated.

QUESTION: Do you take out the gall-bladder in every case?

ANSWER: This was a debatable question until recently, and even at the present time one may find an occasional warning in

the surgical literature against its adoption as a routine procedure. The problem is a fundamental one. There is still some diversity of opinion regarding the part that the gall-bladder plays in the human organism. Medical literature is replete with voluminous reports and exhaustive studies both by clinicians and research workers regarding its function. The conclusions drawn by various investigators are of a divergent character and often baffling to the surgeon.

The two most important arguments advanced against the operation are:

1. The higher mortality rate of cholecystectomy over that of cholecystostomy in the hands of the occasional operator.

2. Injury to the bile-ducts, a serious accident which is not infrequent even in the hands of the most skilful and experienced surgeons.

I must confess that I was in a doubtful state of mind regarding this question until four years ago, but after studying the end-results of a fairly large series of gall-bladder operations which included almost an equal number of cholecystostomies and cholecystectomies, I came to a definite conclusion that the gall-bladder should be removed in every case provided there are no definite contraindications to the operation.

We reserve the operation of cholecystostomy only for the very old or for those suffering from chronic or hazardous diseases, such as chronic or acute pancreatitis or acutely inflamed and gangrenous gall-bladders that can only be removed with great difficulty and with considerable risk to the patient. One must bear in mind the fact that all gall-bladders that contain stones harbor infection in the wall, and the removal of the stones does not eradicate the pathology. Recurrences after drainage operations are very frequent, whereas if total extirpation is done with a thorough exploration of the biliary ducts to make sure that no stones remain behind, recurrences are infrequent.

The convalescence in cholecystectomy is shorter. There is no long and troublesome drainage in the average clean case. It promises a more permanent relief from symptoms than any other gall-bladder operation. Our own statistics which I shall

give you a little later clearly show the unquestionable merits of cholecystectomy over that of cholecystostomy. However, we do not advocate the absolute removal of the gall-bladder in every case regardless of the difficulty that one may encounter in the performance of such an operation.

The operative risk of every individual case and the danger of bile-duct injuries should be considered before one makes a definite decision. Injury to the bile-ducts with the consequent unpleasant result is a most serious accident in gall-bladder surgery. They result in prolonged invalidism and even death, they are extremely difficult to repair, and even repeated attempts to cure them are not always successful.

We recently made a careful analysis of 215 cases operated upon in this clinic for gall-bladder disease. One hundred and ninety-eight of these cases, or 92 per cent., were females, and 17, or 8 per cent., were males. Cholecystostomy was performed on 102 of these cases, or 47 per cent., and cholecystectomy was performed on 113 of these patients, or 53 per cent. Of the 102 cholecystostomies, we find that 17, or 17 per cent., suffered from recurrent attacks of gall-bladder colic of sufficient severity to require re-operation. In 11 of these 17 cases that were subsequently operated by myself, stones were found in the gall-bladder, 4 suffered from a chronic cholecystitis with extensive adhesions between the gall-bladder, stomach, and duodenum, one patient developed a severe attack of cholecystitis and pan-

TABLE 1

Total cases	215
(*a*) Females (92 per cent.)	198
Males (8 per cent.)	17
(*b*) Cholecystostomies (47 per cent.)	102
Cholecystectomies (53 per cent.)	113
Average days in hospital for all cases	19
Average days in hospital after cholecystostomy	21.5
Average days in hospital after cholecystectomy	18
Total deaths	13
	Cases.
(*a*) Following cholecystostomy (7.8 per cent.)	8
(*b*) Following cholecystectomy (4.3 per cent.)	5

TABLE 2

	Years.
Average age of all patients	40
Youngest patient	20
Oldest patient	68
	Cases.
Nulliparous women	16
Parous women	182
Cases operated on primarily for gall-bladder	205
Incidental to other operations	10
Previous history of jaundice (25 per cent.)	53

TABLE 3

STATISTICAL DATA ON CHOLECYSTOSTOMIES

Total number of cases	102
Deaths	8
Unimproved (re-operated)	17
Improved	6
Untraced	5
Cured (67.6 per cent.)	69
Postoperative hernia (7 per cent.)	7

creatitis three years following the original drainage operation, and one patient had a recurrent attack of cholecystitis, biliary fistula, and chronic pancreatitis with stone in the pancreas which was discovered at autopsy.

Six of these cholecystostomy operations are classified as improved, but they frequnetly suffer from symptoms of upper abdominal discomfort, occasional pain, but no jaundice. We are unable to trace 5 cases of this series in our follow-up. The percentage of cured, if we may class those cases who remained free from symptoms for a period of three years after the operation, is 67.6 per cent., or 69 cases.

The time elapsed after the operation is not sufficiently long to draw any definite conclusions as to the ultimate results in these early cases. In other words, in at least 17 per cent. of our cases that have undergone the operation of cholecystostomy a secondary operation of total gall-bladder extirpation was necessary to effect a cure.

If we add to this fairly large group of actual recurrences the 6 cases classified as improved, in whom the probability of a secondary operation is very likely to be indicated, and if we

also take into consideration the fact that those cases who are free from symptoms only for a short period of time may give a certain percentage of recurrences, the results of cholecystostomy are not what one would most desire.

TABLE 4

STATISTICAL DATA IN CHOLECYSTECTOMIES

Total number of cases	113
Deaths	5
Improved (7.1 per cent.)	8
Untraced (7.1 per cent.)	8
Cured (80 per cent.)	90
Postoperative hernias (3.5 per cent.)	4

On the other hand, let us consider from a comparative standpoint the end-results obtained from the cholecystectomy operation. The total number of cases in this group is 113. Eight, or 7.1 per cent., in this series are classified as improved. Eight, or 7.1 per cent., are untraced. The number of cases classified as cured is 90, or 80 per cent.

Of the cases classified as improved in this series, 4 suffered from very mild gastric disturbances, such as an occasional attack of gastric flatulence, epigastric distress after meals, diarrhea, and only 1 case has had several attacks of sharp upper abdominal pain. The *x*-ray showed a shadow in the region

TABLE 5

ANALYSIS OF 90 CHOLECYSTECTOMIES WHO REMAINED WELL

	Cases.
10 to 20 years	7
5 to 10 years	30
3 to 5 years	10
3 years	35
1 year	8

ANALYSIS OF 69 CHOLECYSTOSTOMIES WHO REMAINED WELL

	Cases.
10 to 18 years	7
5 to 10 years	42
3 to 5 years	11
Under 3 years	9

TABLE 6

ANALYSIS OF CASES OF CHOLECYSTECTOMIES IN WHICH PREVIOUS CHOLECYSTOSTOMY WAS PERFORMED

Time elapsing between operations.	Findings at first operation.	Findings at second operation.
1. 14 years	Stones	Cholecystitis
2. 10 years	Stones	Cholecystitis
3. 10 years	Stones	Cholecystitis
4. 7 years	Stones	Stones
5. 6 years	Stones	Stones
6. 4 years	Stones	Stones
7. 4 years	Stones	Stones
8. 4 years	Stones	Cholecystitis
9. 3 years	Stones	Cholecystitis Pancreatitis
10. 3 years	Stones	Stones
11. 2 years	Stones	Stones
12. 2 years	Stones	Stones
13. 2 years	Stones	Stones
14. 1 year	Stones	Stones
15. 1 year	Stones	Stones
16. 4 months	Empyema	Stones
17. 3 months	Cholecystitis	Cholecystitis Pancreatic stones

of the pancreas and the roentgenologic interpretation was probable stone in the pancreas.

This patient had a cholecystectomy performed three years after the cholecystostomy. The operative findings at that time were: Acute pancreatitis and cholecystitis. Careful exploration of the bile-ducts failed to reveal any stones. There was never a history of jaundice either before the first operation or during the interval between the first and second operations. She made an uneventful recovery, has never been jaundiced since, but she has had these repeated attacks of pain in the epigastrium, sharp in character and radiating to the dorsal region. There is no history of pyrosis or hunger-pain, no evidence of any gastric or duodenal ulcer, so that the roentgenologic interpretation, viz., stone in the pancreas, is probably correct and is responsible for her present symptoms.

Forty-seven of these patients that are classified as cured in this series remained well for a period of from five to twenty

years; 35 remained well for three years, and 8 for one year. We feel fairly certain that these recurrences after the drainage operation are not due, as some would lead us to think, to stones overlooked at the first operation. We always made it a practice to make a very careful exploration of the cavity of the gall-bladder and the biliary ducts in every case to make sure that no stones were left behind.

One case stands out particularly in our minds as an example of a rapid formation of stones following an acute attack of purulent cholecystitis which was drained. A careful exploration of the gall-bladder cavity and the bile-ducts failed to reveal any stones during the operation. Drainage was instituted and the patient made a good operative recovery. She returned three months later with severe attacks of gall-stone colic, and a secondary operation revealed several large stones in the gall-bladder.

Personal observation and experience are always most impressive and convincing. The results obtained in these two distinct groups of cases are sufficient to convince one that total extirpation of the gall-bladder in suitable cases offers a much better prospect for a permanent cure.

There are several other factors that one may take into consideration that would influence him in the choice of the type of operation, such as the duration of postoperative convalescence, wound infection, postoperative hernia, etc. Our own statistics show that the average duration of the patient's stay in the hospital is considerably shorter in the cholecystectomy operation. The average stay in the hospital was 21.5 days in the cholecystostomy operation, and eighteen days in the cholecystectomy operation.

Wound infection was much more common in those cases where drainage operation was performed than in the cholecystectomy operation. The incident of postoperative hernia was much greater in our cholecystostomy operation—7 per cent. as against 3.5 per cent. in the cholecystectomy operation. We believe that the incidence of postoperative hernia in the latter group of cases can be still further reduced if drainage were only

limited to those cases where one had reason to believe that soiling of the peritoneal cavity has taken place during the operation.

TABLE 7

ANALYSIS OF CHOLECYSTOSTOMY DEATHS

Findings at operation.	Cause of death.	Days postoperative.
1. Cholecystitis and stones	Pneumonia	5
2. Acute cholecystitis and pancreatitis	Acute pancreatitis	3
3. Cholecystitis	Uremia	2 weeks
4. Empyema of gall-bladder with peritonitis	Peritonitis	3
5. Cholecystitis	Paralytic ileus peritonitis	5
6. Ruptured gall-bladder with acute pancreatitis	Peritonitis	6 hours
7. Acute cholecystitis with acute pancreatitis	Vasomotor collapse	22
8. Empyema of gall-bladder	Peritonitis	3

TABLE 8

ANALYSIS OF CHOLECYSTECTOMY DEATHS

Findings at operation.	Cause of death.	Days postoperative.
1. Stones	Pneumonia	3
2. Stones	Evisceration of wound—acidosis	11
3. Ruptured gall-bladder	Peritonitis	2
4. Biliary fistula with pancreatic lithiasis and subdiaphragmatic abscess	Peritonitis	4
5. Stones	Shock and injury to hepatic ducts	12 hours

In analyzing our mortality statistics we find that the death rate in cholecystostomy was higher than in that of cholecystectomy. This can be explained by the fact that a large percentage of our drainage patients were suffering at the time of admission to the hospital from either severe acute gall-bladder infections, or some complicating constitutional disease, such as chronic nephritis, acute pancreatitis, or chronic respiratory affections.

In 2 patients of this group acute cholecystitis and pancreatitis are found at the operation. One of these patients died three days following operation and the other died twenty-two days postoperatively from sudden vasomotor collapse. Autopsy

in this latter case showed marked splanchnic dilatation with extensive extravasation of blood into the lumen of the bowel.

Peritonitis was the cause of death in 3 cases. In 2 of these acute suppurative cholecystitis with localized peritonitis was found at the operation. The third case was admitted to the hospital with a diagnosis of ruptured gall-bladder and acute pancreatitis of three days' duration. She was almost moribund on admission and died six hours following operation. Uremia two weeks following operation was the cause of death in one and pneumonia in the other.

Our death rate in cholecystectomy is much smaller than that of cholecystostomy. Whereas the total death rate of the latter is 7.8 per cent., that of the former, viz., the cholecystectomy, is 4.3 per cent. In deaths from cholecystectomy we find that one died from peritonitis following operation for biliary fistula and subdiaphragmatic abscess, with pancreatic lithiasis. This patient at a previous operation for cholecystitis suffered from a biliary fistula of several months' standing. He was in poor condition at the time of operation and died from peritonitis on the fifth day postoperatively. Autopsy in this case revealed pancreatic lithiasis with peritonitis.

Pneumonia was the cause of death in one. This was the case of a young woman who gave a history of chronic respiratory

TABLE 9

RÉSUMÉ OF STATISTICAL MORTALITY

Total deaths	13
(*a*) Following cholecystostomy	8
1. Cases with complications	3
(*a*) Acute hemorrhagic pancreatitis	2
(*b*) Empyema with peritonitis	1
2. Cases without complications	5
Corrected mortality	5 per cent.
(*b*) Following cholecystectomy	5
1. Cases with complications	2
(*a*) Ruptured gall-bladder with peritonitis	1
(*b*) Biliary fistula with pancreatic lithiasis and subdiaphragmatic abscess	1
2. Cases without complications	3
Corrected mortality	2.7 per cent.

trouble, and tuberculosis was suspected in her case. Evisceration of the wound on the eleventh day following operation was the cause of death in one of our patients.

She made an uncomplicated postoperative recovery, her sutures were removed on the tenth day, but on the eleventh day during the night the patient got out of bed, stumbled, and the evisceration took place. Her wound was resutured, but she died two days subsequently from what appeared to be a general acidosis.

This accident occurred twice in our series. In one it was a case of a young man who suffered with chronic asthma. His sutures were removed on the ninth day, he eviscerated the following day, wound was resutured immediately, and the patient made a good recovery.

Peritonitis complicating a ruptured gall-bladder of twenty-four hours' duration was the cause of death in another case. This patient was admitted to the hospital with a history of sudden onset of sharp abdominal pain twenty-four hours previously. The symptoms of generalized peritonitis were evident and upon operation a ruptured and gangrenous gall-bladder with a diffuse peritonitis was found. At the time of operation her gall-bladder was removed because it was gangrenous throughout its entire extent and there was considerable sloughing of its walls. It could not be utilized for drainage purposes and it was deemed best to remove it. The patient died of peritonitis on the second day.

The last case was a young man who had a previous cholecystostomy performed by another surgeon. In attempting to remove the gall-bladder, which was very small and firmly adherent to the adjacent structures, the right hepatic duct was severed. An attempt was made to repair it. The operation was prolonged and the patient became profoundly shocked. It was then decided to defer the repair of the injured duct. The patient never came out of the shock and died twelve hours later.

This case illustrates the danger of injury to bile-ducts, particularly in secondary operations where the adhesions are

very extensive with small contracted gall-bladder, and the identification of the cystic duct is rather difficult. Whether this patient had an anomaly of his biliary ducts we were unable to determine at the time of operation.

CONCLUSIONS

1. Statistical data gathered from the personal follow-up of this group of cases convinced me that the operation of cholecystectomy is one of choice in most cases.

2. Whenever the operation presents considerable difficulty, particularly in the hands of the occasional operator, cholecystostomy is the safer method.

3. Acute, suppurative gall-bladder disease, either with or without complications, should be treated by drainage.

4. Injury to bile-ducts may be averted by very careful dissection and clear visualization of the cystic duct before it is ligated.

5. Drainage in cholecystectomy should only be reserved for those cases where we have reason to believe that soiling of the peritoneum has taken place during the operation.

BILIARY FISTULA WITH CHRONIC CHOLECYSTITIS AND PANCREATIC LITHIASIS

DRS. MAX DANZIS AND SAMUEL SOSCHIN

THIS patient is an adult male, white, forty-three years of age, a jeweler by occupation. He was admitted to the ward medical service for observation on July 16, 1925, complaining of irregular attacks of sharp epigastric pain for the past three months. The pain came from a half-hour to seven hours after meals, being preceded by a burning sensation in the epigastrium and pyrosis. The pain always radiated to the right shoulder, lasted about ten minutes, and was followed by a dull ache in the epigastrium. No attack was ever accompanied or followed by jaundice. He induced vomiting once without relief of the pain. He lost 20 pounds during this time. He was constipated, but never noticed any bloody or clay-colored stools. The chief points in his past history were scarlet fever at sixteen, joint pains, fever, and jaundice in 1911. In 1919 he was in a hospital where a diagnosis of cirrhosis of the liver was made. Physical examination at this time was negative except for some soreness in the epigastrium on depalpation. Urine examination showed glucose varying from 0.6 to 3.5 gm. in a twenty-four-hour specimen. The blood-sugar was 220. Gastric analysis was negative. *x*-Ray of the gastro-intestinal tract showed a hypertonic stomach with a possible chronic appendicitis. After a week of antidiabetic treatment, during which time the urine became sugar free, he was transferred to the surgical service, with a diagnosis of chronic cholecystitis and chronic appendicitis. At operation the findings were: Chronic appendicitis, chronic pericholecystitis, and chronic perihepatitis. The common duct and pancreas were markedly thickened and indurated, but no stones were felt. The appendix was removed and cholecystostomy was performed. He made an uneventful recovery, and was discharged on September 2, 1925.

The patient felt well while at home and after a week was up and about. The following week, however, he experienced severe pain in the operative area, necessitating the use of morphin. Following this attack the wound opened and there was a profuse discharge of bile. After two weeks the discharge ceased and he felt well again. A month later he had malaise, headache, and fever, and again the wound opened, discharging large quantities of bile. After a week his symptoms subsided and the wound closed. Four weeks prior to his present admission he was seized with a sharp attack of pain in the epigastrium, which radiated to the right shoulder, following which he again drained about a quart of bile. Since then he continued to drain a thick, yellow fluid. Two weeks ago he was slightly jaundiced and had clay-colored stools. One week ago he re-entered our service.

His physical condition at present is negative except for the abdominal findings. He is not jaundiced, as you see. The liver is palpable about three fingerbreadths below the free costal border. It feels firm and regular, but not nodular. The spleen can be easily palpated and feels very firm. No mass can be felt in the epigastrium. The sinus is present, as you see, in the upper angle of the old scar, from which a thick, yellow bile is exuding. The record shows that a culture from the sinus shows Bacillus coli. The Van den Bergh reaction is negative. His icteric index is 20, which is slightly above normal. The Wassermann is negative.

QUESTION: Was a cholecystography performed on this patient?

ANSWER: Yes, but it was unsatisfactory, the roentgenologist reporting that the kerasol capsule was found in the transverse colon about thirty-six hours after ingestion. We will perform this operation under abdominal field block and splanchnic anesthesia, and we will ask our anesthetist, Dr. A. Reich, to say a few words about the various forms of anesthesia employed in this clinic.

DR. A. REICH: Ether was the routine anesthetic in all cases, whether of a minor or a major nature, regardless of the general condition of the patient. This certainly was not an ideal pro-

cedure. Today we are prepared to fit the anesthetic to the patient instead of making the patient fit for the anesthesia. In this clinic we have been attended by a great degree of success by regional anesthesia methods. Among a great number of procedures employed, the splanchnic anesthesia associated with abdominal field block has been frequently administered, with gratifying results.

For abdominal operations three procedures are at hand: The spinal, paravertebral, and abdominal field block with splanchnic block. The spinal anesthesia is absolute, but carries these disadvantages. Some surgeons object to its use on account of the danger frequently associated with its administration. The fall of blood-pressure in spinal anesthesia and the general appearance of profound shock that the patient presents immediately following its administration has deterred many surgeons from its use. The reports of occasional deaths through its use have led some to believe that the employment of this method of anesthesia is associated with a higher percentage of mortality than any other form. However, the reports from those men who have made a careful study in the use of this form of anesthesia show that if properly administered to a carefully selected group of patients the risks are not as great as one would be led to believe. The objection to its use will be overruled only by time and experience. The only positive contraindication to its administration is the patient who suffers from a hypotension. Another objection is that the anesthetic is of short duration, but if it is associated with an abdominal field block this objection is overcome. In upper abdominal surgery a high lumbar injection, such as between the twelfth dorsal and first lumbar space, is necessary.

The paravertebral anesthesia is an excellent method, but the injections must be exact, and occasionally one spinal nerve is missed, thus making the anesthesia incomplete. It is not as certain as spinal anesthesia. Then again, a great number of nerves, often as many as fourteen to sixteen, must be injected. These multiple injections associated with the parasthesias are exhausting to the patient.

Abdominal field block gives a perfect anesthesia, the range of operative field being wide enough for the average operation. The peritoneum lining the parietal and posterior abdominal wall is not included in the field of anesthesia, but with extreme care and surgical dexterity on the part of the surgeon contact with these areas may be avoided. The anesthesia is complete from the skin to the anterior abdominal muscles including the peritoneum lining the anterior abdominal wall.

As a rule, in doing an operation under local anesthesia, the operator fails to remember that the whole abdominal wall is supplied through its entirety by the spinal nerves. Therefore, when the block is made and the barrage thrown across the path of the nerve, the entire abdominal wall is anesthetized.

Intra-abdominally the sensory nerve supply to the mesentery and viscera comes from the semilunar ganglia. These are located one on each side of the first lumbar vertebra, sometimes as low as the second. There are several methods of approach to block these ganglia. The method practised in this clinic is the posterior route devised by Kappis and modified by Labat.

This patient being operated now was given this anesthesia because of his diabetes. This is the second time he has been operated upon with this method.

Operation.—We will put a probe into the sinus and cut down on the old scar. There is no undue oozing, as you see, the patient having received three injections of calcium chlorid intravenously. We have the peritoneal cavity opened below the fistula and find that the tract leads down to the gall-bladder, which is buried in adhesions and very tense. We have now excised the tract and clamped the opening in the gall-bladder. As we are separating the gall-bladder from its adhesions we notice another tract leading to the anterior surface of the liver, just below the falciform ligament. There is a subphrenic collection of purulent bile and detritus which is communicating with the gall-bladder by a fistulous tract. The cavity seems to be well walled off by firm adhesions of the liver to the diaphragm. We can feel no stones in the gall-bladder or extrahepatic passages. The foramen of Winslow is obliterated by

tensive adhesions, so that the pancreas cannot be palpated. We have now isolated the cystic duct by blunt dissection of the hepaticoduodenal fold, and you can see the clamp encircling the duct. The cystic artery which is lying just above the duct is ligated. We have now severed the cystic duct and removed the gall-bladder from below up.

Before removing the gall-bladder we ligate the cystic duct, the gall-bladder acting as a tractor. All raw surfaces are peritonealized. We are inserting one drain into the subphrenic abscess and one down to the stump of the cystic duct, and close the abdomen with through-and-through sutures of silkworm-gut.

Subsequent Course.—The patient had a moderate postoperative reaction and did well for the first three days. On the fourth day he began to develop signs of a spreading peritonitis which rapidly became worse, and he succumbed on the fifth day. Partial necropsy performed by Dr. S. J. Soschin revealed the following: There was a diffuse purulent peritonitis with a collection of pus behind the caput coli and descending colon. The liver was enlarged to four fingerbreadths below the costal margin, and very firm in consistency. Its anterior and superior surfaces were intimately united by firm organized adhesions to the diaphragm. On its anterior surface just above the falciform ligament there was an abscess cavity about 8 cm. wide and 6 cm. long containing mucopurulent bile and débris. The liver capsule which formed the floor was intact. The hepatic ducts and common bile-duct were thickened and dilated. The head of the pancreas was covered by adhesions and an exudate between the first and third portions of the duodenum. The pancreas was firm in consistency and felt nodular. Sections of the gland made by our pathologist, Dr. Asher Yaguda, show it to be a firm, dense, grayish-white tissue with islands of yellowish glandular tissue and many cavities lined by a smooth membrane and filled with small grayish-white stones. The duct of Wirsung and some of the larger ducts were filled with ragged grayish-white mulberry stones. Microscopic examinations of sections through the head and tail of the gland show a dense, acellular fibrous tissue in which are located islands of atrophic pancreatic

tissue. In these glandular areas the islands of Langerhans appear intact. There is a quantitative diminution in glandular tissue, the most marked atrophy involving the acinar tissue. The stones have not been analyzed at the present time.

Discussion.—Pancreatic lithiasis was first reported by Graaf in 1667. Seeger in 1925 reported an extensive search of the literature in which he found only 100 cases, one of which was his own. He reviewed and tabulated 22 cases in which operation

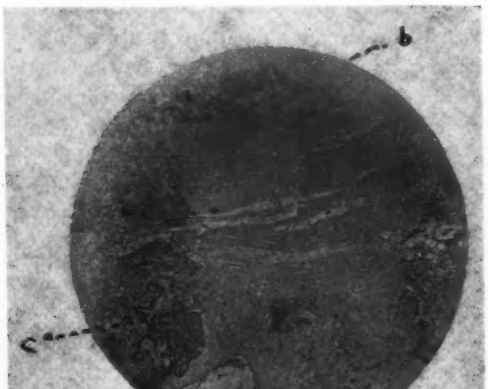


Fig. 461.—Section through pancreas showing marked fibrosis: *a*, Dilated duct; *b*, dilated duct filled with detritus and salt deposit; *c*, atrophic glandular elements.

was performed. Since then there have been 4 cases of pancreatic stone demonstrated at operation at the Mayo Clinic as reported by Hartman. In spite of the fact that pancreatic lithiasis is not a common disease, it is of more than academic interest. In 1920 Barron reported a case of pancreatic stone which illustrated the fact previously brought out by Opie, that obstruction of the pancreatic ducts is accompanied by atrophy of the pancreas, but that the islands of Langerhans remain

intact even when the acini disappear completely, and as a result glycosuria does not develop unless an interstitial pancreatitis is superimposed. This interesting finding stimulated Banting and led to the discovery of insulin.

The stones are generally white, grayish-white, or yellowish-white in color, rounded or ovoid, and rarely faceted. They vary in size from sand to 6 cm. They are found in all parts of the gland, including substance and ducts, but most commonly in the duct of Wirsung and head.

Stasis is probably an etiologic factor, though stasis is rarer here than in the biliary tract due to the presence of an accessory duct or ductus Santorini. That stagnation alone does not explain the formation of stones is shown by the fact that stricture of the pancreatic duct is not uncommon, whereas stone is quite uncommon. The chief chemical constituent of the stones is calcium carbonate. The fact that normal pancreatic secretion contains no calcium carbonate makes it reasonable to assume that the pancreatic secretion altered either by infection or pancreatitis will in the presence of stasis cause stone formation. That the reflux of bile into the pancreatic duct is not a common factor in the production of pancreatitis has been shown by the experimental work of Mann and Giorno. Infection originating in the gall-bladder or biliary passages is probably the important factor, since we know there is an intimate connection between the lymphatics of the gall-bladder and the pancreas, and inflammatory conditions of these two organs are not infrequently associated.

The diagnosis of pancreatic calculi has rarely been made. Moynihan in 1902 was the first to operate upon this condition in which a tentative diagnosis was followed by operation. Osler in 1903 writes: "The correct recognition of calculus disease of the pancreas is one of the most difficult tasks of the clinician, as may be illustrated by the fact that in the accessible literature of the subject the correct diagnosis was made only five times, and then by Lancereaux, Caparelli, Lichtheim, Minnich, and Leichenstern. The last two found pancreatic calculi in the feces. Caparelli observed the passage of stones from an abscess and

Lancereaux and Lichtheim based their diagnosis on the occurrence of diabetes preceded by attacks of colic."

Pain is the most constant symptom of this disease and is variable in character. It is usually situated in the epigastric region, dull and continual in character, with occasional severe colic simulating biliary colic. Vomiting during the acute attack usually does not relieve the pain. Radiation to the lumbar region is said to be characteristic. Early cases do not show glycosuria. In the advanced cases when an interlobular pancreatitis is present glycosuria is present. Jaundice is not uncommon, but of a mild degree. It is usually due to edema of the head of the pancreas or to obstruction of the lower end of the common duct by the calculus as it reaches the ampulla of Vater. Azotorrhea, steatorrhea, and diarrhea are indicative of deficient pancreatic secretion.

The use of the Roentgen ray is an aid in diagnosis. Mayo-Robson suggested its use because of the large amount of calcium present in these stones. In the presence of a shadow in the region of the pancreas care must be taken to rule out kidney calculi.

Of the 22 operative cases analyzed by Seeger, 2 died. This with his successful case gives a mortality rate of 8.5 per cent. In neither of the fatal cases was death due to fat necrosis or any other complication due to exposed pancreatic tissue. Of the 20 successful cases, not one case of permanent fistula occurred. There are three methods by which a stone in the pancreas may be approached. In the first method the gland may be reached by incising the gastrohepatic or the gastrocolic omentum. Access to the posterior surface of the gland is obtained by mobilizing the duodenum. The mesentery on the right side of the descending portion is incised and the duodenum is drawn to the left and upward. A third method of approach is by opening the duodenum, exposing the papilla of Vater, incising this, and passing a scoop or fine forceps along the duct.

SPONTANEOUS HEMORRHAGE WITHIN RIGHT RECTUS SHEATH SIMULATING ACUTE APPENDICITIS

THE following case about to be presented is a woman sixty-four years of age who comes to us with a chief complaint of pain in the right lower quadrant. She is a woman who has always had a marked hypertension, her blood-pressure ranging between 160 and 220, but she seemed to get along fairly comfortably. She had two previous operations performed, the first a cholecystostomy and the second a gastro-enterostomy twelve and three years ago respectively. Her menopause occurred twenty-three years ago. Her present illness occurred about twenty-four hours prior to her admission. During the night she was awakened from her sleep with generalized abdominal cramps. She was nauseated, but did not vomit. After several hours the pain became localized in the right lower quadrant. The pain was of a colicky, boring character and did not radiate. She felt feverish. On the advice of her physician she entered the hospital.

On physical examination we find a poorly developed and nourished female who appears acutely ill. The superficial temporal arteries are prominent and feel sclerotic. Her heart and lungs are essentially negative. The abdomen shows the scars from the previous operations. It seems slightly distended. On palpation she is tender throughout. In the right lower quadrant we can hardly apply our hands to the skin without her experiencing severe pain. In this region we can also feel an indefinite mass, slightly doughy, whose outline seems to shade with the surrounding structures. There is marked rigidity of the lower abdomen. Vaginal examination shows a senile atrophy of the vagina and uterus. Nothing can be felt in the fornices or cul-desac.

The blood examination showed a leukocyte count of 10,000

with an 87 per cent. polynucleosis. The hemoglobin was 90 per cent. The urine showed a heavy trace of albumin with hyaline casts. The Wassermann taken on a previous admission was negative.

This patient presents the symptoms of an acute abdominal condition both from an objective and subjective group of symptoms. The sudden onset of generalized abdominal pain that became localized in the right iliac fossa, the associated nausea, the tenderness over the appendicular area with the presence of a mass in that region associated with an elevation in temperature, strongly point to acute appendicitis as the probable diagnosis. The low leukocyte count may be disregarded, as we have observed in our experience that this is not infrequently the case in acute appendicitis, particularly in elderly people.

We are now making a right rectus incision. As we expose the sheath of the rectus muscle we note that there is bulging, with a bluish discoloration. As we incise the anterior layer we find a large collection of clotted and fresh blood within the sheath. The blood and clots have been mopped up and you notice that the muscle is of a gelatinous character and extremely friable. The peritoneum is lax and ecchymotic. We are evidently dealing in this case with a hemorrhage within the rectus sheath, a rather uncommon condition. As you noted in the history there was no trauma, the patient stating that she was awakened from her sleep with the pain. The only explanation that we can offer for this pathology is an athermatous condition of the local blood-supply with a rupture of one of the vessels in the sheath. She does suffer from a generalized arteriosclerosis. The local findings in this case will probably explain her symptoms, but one cannot be absolutely certain that there may not be concomitant intra-abdominal pathology, most likely appendicitis, so we will proceed to open the peritoneum. There is no free fluid in the peritoneal cavity. The appendix is easily located and delivered. Aside from a few concretions at the tip it is grossly normal. The appendix has been removed and the peritoneum closed. No further exploration is deemed necessary, since enough pathology was found in the right iliac fossa to account for her symptoms.

The bleeding in the muscle is controlled by deep mattress sutures. We will imbricate the facsia and close the skin with silkworm-gut.

Subsequent Course.—The patient made a smooth recovery. The wound healed per primum, and she was discharged as cured on the thirteenth day.

Discussion.—Spontaneous hemorrhage into the rectus sheath is a condition uncommon enough to warrant some discussion and recording as the cases may arise. In 1923 Wohlgemuth collected 127 cases from the literature. Of these cases he classified 20 as being real spontaneous ruptures, the others followed severe exertion or trauma. In 1923 a case was described by Hilgenreiner and 1 by Wohlgemuth, the latter adding to his own 2 others attributed to Ehrenfest and Koerte. In the following year 4 cases were reported, 1 each by Harris, Blond, von Renner, and Whittingdale. Culbertson in 1925 added 2 more cases. Hilgereiner has divided these cases into two groups: the first traumatic, due to (*a*) direct or (*b*) indirect violence. These occur chiefly among cavalry recruits, gymnasts, and others who use their abdominal muscles to withstand violent force. The second or spontaneous group is due chiefly to marked changes in the muscles and blood-vessels, through chronic infection, arteriosclerosis, lues, abuse of alcohol, or because of purely senile changes.

In only 3 cases was rectus hematoma diagnosed correctly and in 2 other cases it was suspected. In 7 cases the condition was thought to be ovarian cyst with twisted pedicle, in 6 cases appendicitis, in 2 ovarian tumor, in 2 gall-bladder disease, and in 2 appendicitis and ovarian cyst. In 1 case diagnoses of mesenteric embolism, intestinal obstruction, abdominal hernia, desmoid tumor, and ectopic gestation were made. The hematoma usually occurs in that portion of the sheath between the umbilicus and pubes. The patient experiences severe pain in the abdomen localizing over the side involved. Nausea and vomiting may be present. The patient often notices that a palpable resistence arises, and in case of thin persons this often appears as a visible swelling. The size may vary from that of an egg to a child's head. It is generally round, but if the hema-

toma becomes very large it assumes an elongated form, conforming to the sheath of the rectus. It is usually firm in consistency and very tender to touch. In thin persons it is distinctly palpable and has a sharply defined limit, but in stout persons the resistance is less distinctly palpable. With a relaxed abdominal wall the mass can be moved laterally. The most important characteristic is that it is located on one or the other side of the midline, within the area of the sheath of the rectus. Discoloration of the skin of the abdomen is sometimes seen. The condition may be easily confused with an intra-abdominal lesion, as we have shown above.

The treatment is operative unless the hematoma is very small. When the extravasation is large enough there is persistent pain, the muscle undergoes pressure necrosis, the anterior rectus sheath becomes stretched and attenuated. The hematoma may become infected or it may break into the peritoneal cavity. It is best therefore in our opinion for radical treatment rather than conservatism.

DERMOID CYST IN UMBILICAL HERNIA. TORSION OF PEDICLE. INTESTINAL OBSTRUCTION

DRS. MAX DANZIS AND EUGENE PARSONNET

THE patient that we are about to operate upon is a white female, aged sixty, housewife by occupation, who was admitted to the hospital about three hours ago complaining of severe abdominal pain, constant vomiting, and a large pendulous mass in the abdomen.

She states that for the last twenty years she had a protruding tumor at the umbilical region. When first noticed it was the size of an egg. It continued to increase in size until it reached the size of a large watermelon. Until two years ago the patient experienced no serious difficulty, except a sense of weight and bearing-down sensation due to pressure. About this time she began to experience occasional attacks of nausea, gastric irritation, and vomiting unassociated with ingestion of food. She has lost about 50 pounds in weight during the last two years, her present weight being 112 pounds. Her habits were always regular, her appetite was good, her vomitus never contained blood, and with the exception of the symptoms that we have just enumerated her previous history is irrelative.

Two days prior to her admission she was suddenly seized with a severe cramp-like pain in the epigastrium, which became generalized over the entire abdomen. This pain continued through the night and she became nauseous and vomited repeatedly during the following day, rejecting both solid and liquid food. She is positive that she had no bowel movement since the onset of the pain and that no flatus was expelled. A physician was called, who advised her immediate removal to the hospital.

The abdominal examination of this patient shows a very large oval tumor-mass, springing from the midline in the region of the umbilicus. This mass is pendulous. It hangs over the

pubic region, and when the patient is in an upright position its lower border reaches down to the middle of the thighs. The mass is of an irregular outline, cystic in consistency, not very tender to pressure, and irreducible. Its contents seem to protrude through a large opening in the umbilical region and probably visceral in character. On bimanual examination a soft cystic mass about the size of a grape-fruit can be made out in the upper pelvic cavity. This mass seems to be continuous with the extra abdominal mass and moves with it. Peristalsis is visualized above this tumor. One can easily discern a peristaltic wave moving in the direction of the umbilicus and stopping at that point. These peristaltic movements are accompanied by a cramp-like pain.

The patient's temperature on admission was 101° F., pulse 80, respiration 20, blood-pressure 140/70. The urine showed a trace of albumin, otherwise negative. Blood count: leukocytes 14,400, with a normal differential count.

The history of this case shows that this mass is of long duration, that it continued to increase in size for a period of twenty years without giving the patient any serious disturbance until two years ago. The occasional attacks of nausea and vomiting from which she suffered during the last two years were of short duration and were relieved spontaneously without any medication. There is no history of chronic constipation or previous intestinal obstruction. She never had any tenesmus, bloody stools, or hematemesis. There is no history of colicy pain or jaundice. This present attack came on suddenly forty-eight hours ago with nausea, constant vomiting, and constipation. These symptoms combined with the presence of the mass protruding through the umbilical region, with visible peristaltic waves at that area associated with severe cramp-like pain, lead us to believe that this patient is probably suffering from an old incarcerated umbilical hernia which suddenly became strangulated causing intestinal obstruction. The cystic mass that is palpable in the pelvis may be an ovarian cyst. Whether this cyst became strangulated through torsion of its pedicle is very difficult to determine. The marked abdominal tenderness and

distention, the large irregular pendulous mass, and the general physical condition of the patient at present are such that an exact differentiation between these two conditions is almost impossible. Her preoperative diagnosis is intestinal obstruction, due to strangulated umbilical hernia.

Operation.—We will proceed to make a horizontal incision over the tumor mass with the convexity downward. As you notice the skin is intimately adherent to the underlying structure, which in this case proves to be peritoneum, probably the hernial sac. As we open this layer we find that its contents consist of a large fluctuating mass about 12 inches in diameter. We also notice several loops of small intestine adjacent and adherent to this mass. The major portion of this tumor is extra-abdominal, making up most of the contents of the sac. It is divided into two portions by a wide constricting band. The larger portion is extra-abdominal, and the smaller segment is partly within the pelvis above the brim. This lower segment is probably the mass which we were able to palpate when we made our bimanual examination. The tumor is attached to the left broad ligament by a long pedicle, which is twisted about itself and has a gangrenous appearance. You will notice that the mass appears markedly injected throughout its entire extent, dusky in color with venous engorgement. There is a considerable amount of fluid in the peritoneal cavity. At the upper border of the mass we find a loop of small intestine firmly adherent to it by a very strong band, forming the traction diverticulum of the intestine at this point by the weight of the tumor. There is also a marked angulation of the bowel at this point, causing a distinct constriction of its lumen, as evidenced by the collapsed bowel below this point and the distended loops of intestine above it.

The adhesions between these intestinal loops are separated from the tumor mass, taking precautions not to injure the intestinal structures. The raw surfaces are carefully serosised. The traction diverticulum is treated by inversion with a double row of sutures. The pedicle is clamped and ligated, and the tumor mass removed. We make sure to ligate all bleeding points so

that we get a perfectly dry field before closure. The large and redundant sac is resected and the peritoneum closed. The recti muscles which are widely separated are isolated and coaptated, and the fascial repair is done by the overlapping Mayo method. A rubber drain is inserted under the skin to take care of any subcutaneous oozing that may occur.

As you notice in this case, we were unable to isolate the layers of the abdominal wall during the first stage of the operation before the sac was opened, on account of the wide retraction of the muscle and fascia, so that these preparatory steps in the hernial repair had to be carried out while the peritoneum was open. This procedure adds considerably to the shock of the operation, and certainly is not the ideal method to adopt in the repair of this type of a hernia.

In operating upon ventral umbilical or postoperative hernias every effort should be made to consume a minimum of time in keeping the peritoneum open. We have observed and frequently shown that there is always a considerable increase of pulse rate and fall in blood-pressure as soon as the peritoneum is opened in these cases. This was particularly true in those patients upon whom the operation was carried out under local or regional anesthesia. This condition is in direct relationship to the duration of time that is consumed in keeping the peritoneum open and the extent of intraperitoneal manipulation. We have therefore made it a point to carry out all the preparatory steps in hernial repair, such as the dissection of the layers of the abdominal wall, particularly the fascia, before the peritoneum is opened.

The peritoneal sac is then dissected from the under surface of the rectus sheath and incised. The inspection of its contents and the separation of intraperitoneal adhesions and ligation of the sac requires but a few moments, and the remaining steps of the operation are then completed. The shock of the operation is thereby considerably lessened.

Pathologic Report.—Submitted by Dr. Asher Yaguda.

Specimen: Ovarian cyst.

Gross Examination.—Large, irregular-shaped ovarian cyst,

measuring 13 by $8\frac{3}{4}$ by $5\frac{1}{4}$ inches in its greatest dimensions. The surface is smooth, irregular, and divided into two main portions, each irregularly spherical in shape, measuring about 8 and 4 inches in diameter respectively. At the junction of these two portions there is a broad pedicle of firm tissue measuring 2 inches in width, $2\frac{1}{2}$ inches in length, and $\frac{1}{2}$ inch in thickness. The covering of the mass is transparent and shows many injected blood-vessels.

On section, the larger cyst is unilocular and contains $2\frac{1}{2}$ liters of bloody fluid. The cyst wall is thin and transparent. The lining is smooth and glistening and shows no evidence of any papillary structure.

Section of the smaller cyst shows it to contain a dark, amber fluid and to be multilocular. The cyst wall is thin and transparent. The lining is smooth and shows no evidence of any papillary structure. The isthmus joining the two main portions of this cyst is saddle shaped and solid in consistency. On section, it is seen to be composed of a cyst wall about 0.5 cm. in thickness. The center of this cyst is filled with a solid mass of yellow homogeneous substance, which has the appearance of butter. Section of the mass shows it to contain a few small hairs. The lining of this portion of the cyst shows areas which are firm and which have a hairy growth. There are other areas which on section show bone formation. At one angle of this cyst wall there is another solid mass, which is rubbery in consistency, and on section shows a fish flesh color and has the appearance of a glandular tissue (thyroid).

There is a large mass of thin, flabby, wrinkled atrophic skin, measuring 13 inches in length by 8 inches in width, not sectioned.

Microscopic Examination.—Section of cyst wall shows it to be composed of fibrous tissue which is markedly edematous. All the veins are greatly distended and filled with blood. There is a small amount of ovarian tissue in the wall. Section taken from the wall of the isthmus shows squamous epithelium of skin, sweat-glands, hair follicles, cartilage, and some bond.

Sections taken from the glandular tissue show it to have the typical structure of a colloid adenoma of the thyroid gland.

Diagnosis.—Dermoid cyst of ovary.

Postoperative Course.—The patient ran an uncomplicated postoperative course and made an uneventful recovery. The drain was removed in four days, the sutures in nine days. She was allowed out of bed in twelve days, and was discharged as cured on the fourteenth day.

Note.—Follow-up six months after the operation shows a firm abdominal wall, no bulging at the site of operation, and no other evidence of a recurrence of the hernia.

Discussion.—Hernia of the ovary, either alone or with the tube, is by no means a common condition. My own experience out of a large series of hernia of all types in women is only limited to one case, that being a direct inguinal hernia with the ovary in the sac. Watson in 1923 made an extensive search of the literature dealing with this condition. He collected in all 487 cases of herniated ovaries and tubes, of which 156, or 30 per cent., were ovary alone. Of these 156 cases there is no record of an ovary being found in an umbilical hernia. They were either of inguinal or femoral origin. The condition found here, viz., a large ovarian cyst with a twisted pedicle within the sac of an umbilical hernia, is extremely rare. The rarity of this condition and the complications existing in this particular case give it an unusual clinical significance and, in our opinion, worthy of reporting.

RECURRENT NEUROFIBROMA

Drs. Max Danzis and Henry Reich

B. K., aged sixty-four, white male, born in Russia, a hat maker by trade, entered the hospital March 11, 1926, complaining of bleeding of two weeks' duration from a tumor of the abdominal wall. His history shows that in 1908 a small lump was excised from his left loin. About one year later (1909) a recurrence was noted. This continued to increase in size, and about seven years after the first operation (1915) the surface became ulcerated and started to bleed. He then submitted to another operation, at which time the entire mass was excised. About three years after this (1918) another recurrence was observed. Like the first recurrence, this continued to become progressively larger, and about two weeks before admission to the hospital the skin again ulcerated, and bleeding brought him in for medical treatment. There has never been any pain associated with this tumor mass, although at times it has been slightly tender to touch. There is no history of any injury either preceding the first appearance of a small lump in 1908 or during his subsequent history. No history of any other member of his family having a similar condition could be obtained. His past history is entirely irrelevant.

Physical examination upon admission to the hospital showed an elderly white patient who did not appear to be ill. Aside from some arteriosclerosis and emphysema of the lungs, the physical examination with the exception of local condition was entirely negative. Locally the patient showed a spherical tumor mass in the left upper quadrant, apparently springing from the skin, the main mass being about the size of an apple, with an ulcerated skin surface. Many scattered nodules are found around the central mass. The mass is not connected with the underlying structures. The skin surrounding it shows some redness and pigmentation. There are no enlarged lymph-nodes

either in the groin or axilla. The blood-count showed a slight secondary anemia. The urine was essentially negative. The blood Wassermann reaction was negative. The patient was prepared for operation, and on March 13, 1926, under gas-oxygen anesthesia, a wide excision of the tumor was made.

Fig. 462.—Photograph taken before operation showing recurrent neurofibroma: *a*, Area of skin pigmentation; *b*, ulceration of skin.

At the operation the tumor mass was seen not to extend into the deeper tissues of the abdominal wall. There was no intra-abdominal mass that could be felt while the patient was under anesthesia. The excision was carried out with the cautery, the skin edges undermined, and brought together with silkworm-gut.

The wound healed by primary union and the patient was discharged April 2, 1926 as cured. Follow-up to date shows no recurrence.

Pathologic report submitted by the pathologist, Dr. Asher Yaguda, shows the following:

Gross Examination.—Shows a piece of skin together with underlying fat and connective tissue measuring 16 cm. in length by 8 cm. in width, the surface of which is studded with many tumor masses. These tumor masses vary in size from 0.6 to 5.5 cm. in diameter. While some of the nodules are entirely intracutaneous, most of them protrude above the surface of the skin and a few are pedunculated. The largest of these masses is a pedunculated, brownish color, irregular-shaped

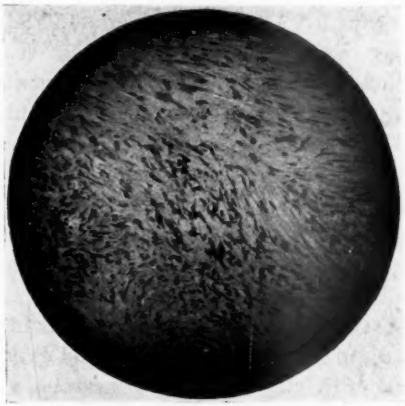


Fig. 463.—Recurrent neurofibroma.

tumor, around the pedicle of which are very many smaller similar tumors. The mass is rather firm in consistency and cuts with a rubbery resistance. The cut surface is moist and glistening, and varies from a grayish homogeneous tissue to a dense white fibrillar structure. The larger portion of these masses is composed of a dense white fibrillar tissue.

Microscopic Examination.—Shows skin and underlying connective tissue in which is located a fibroblastic neoplasm. The tumor is composed of interwoven hyaline fibers with areas of varying cellularity. Sections from the larger masses show less cellularity than those from the smaller tumors. An occasional

sweat gland can be found in these tumors, which have attained a larger size and have become pedunculated. Sections through the ulcerated portion show an atrophic skin due to compression, with an exudative reaction underlying it. The neoplasm does not extend into the skin. An occasional atrophic nerve-fiber can be made out.

Discussion.—When the patient was first seen and examined and his history obtained, a diagnosis of malignancy was considered in view of the facts that there were two recurrences, that the tumor was ulcerated, and that there was considerable loss of weight in the last few months, with some pain in the region of the growth. During the operation the diagnosis of malignancy was changed because of the fact that the tumor seemed to be entirely localized under the skin and did not involve the underlying structures. The regional lymph-nodes were not involved. At the previous operation only the tumor mass was excised. We believe that if a wide excision had been made, including the entire course of the nerve involved, a recurrence would not have taken place. We report this case to emphasize the importance of wide excisions of these apparently benign neurofibromas in order to avoid recurrence.

From the pathologic study the tumor is mainly a fibroma. However, because of its clinical appearance and its definite growth along the course of the nerve, and the presence of a few atrophic nerve-fibers in the tumor, we believe that this tumor must be classified as a neurofibroma. Ewing and others have described similar tumors which were always fibromas histologically, and have classified them as neurofibromas.

CLINIC OF DR. WELLS P. EAGLETON

NEWARK EYE AND EAR INFIRMARY

TRAUMATIC AND INFECTIVE LESIONS OF THE HEAD, THE CHIEF MANIFESTATIONS OF WHICH ARE VISUAL DISTURBANCES; THEIR DIAGNOSIS AND SURGICAL TREATMENT

DURING the past few years I have operated for a number of traumatic and infective lesions, the chief symptom of which was a disturbance of sight.

Ophthalmologists, as a class, have come to realize that on them rests the responsibility of becoming conversant with cerebral conditions, of which visual disturbances are often the earliest manifestations.

Anatomic Observations.—The optic nerves—which histogenetically are not nerves but associated paths between the ganglionic retina and the primary optic centers—pass backward to the optic commissure, where they decussate, the decussated fibers uniting to form the chiasm, from which they continue as the optic tracts to the geniculate, pulvinar, and anterior quadrigeminal bodies (primary optic centers), and from them to the visual perception centers of the occipital lobe. From these perception centers communicating fibers pass to the temporosphenoidal and frontal lobes. Therefore the base of the brain, the central ganglia, the cortex of the posterior and middle cerebral lobes are all in direct communication with the optic tract, and explain why it is so frequently involved in central lesions.

Classification of Visual Disturbances of Intracranial Origin.—The visual disturbances of intracranial origin may be considered as those due to:

1. General increase of intracranial pressure.

2. Direct pressure on the optic nerve posterior to the eyeball, but in front of the optic chiasm.

3. Pressure at the optic chiasm.

4. Pressure between the optic chiasm and the primary optic centers.

5. Pressure between the primary optic centers and the visual cortical centers.

6. Pressure at the visual cortical center in the occipital lobe.

7. Pressure on the association fibers to the temporosphenoidal and frontal lobes.

General Increase of Intracranial Pressure.—*Papilledema.*—The most striking ocular manifestation of an increase in the intracranial pressure is what is frequently designated as optic neuritis; the usual choked disk is not a true inflammation of the optic nerve-fibers, but an edema. Consequently, the term *papilledema* is more generally correct.

There is no completely satisfactory explanation for the presence or the absence of the papilledema in cases of increased intracranial pressure. For while a sudden but slight increase is frequently manifested by papilledema, it is not known why many tumors, growing slowly but attaining large size, often fail to produce any discernible change at the nerve-head.

Horsley[1] claimed that papilledema in increased intracranial pressure from tumors is apt to be most marked on the side of the lesion, but the examination of a large number of cases by Gunn[2] and Parsons[3] failed to substantiate this view.

That Horsley's contention has some basis in fact, however, is shown by the following case:

Case of Large Traumatic, Subdural (but Extracortical) Hemorrhage Giving Rise to Unilateral Optic Neuritis Without Other Definite Localizing Symptoms for a Considerable Period.—M. C., sixty-four years, six weeks previously was

[1] Horsley, Sir Victor: Optic Neuritis, Choked Disks, or Papilledema, Treatment, Localizing Value, and Pathology, Brit. Med. Jour., March 5, 1910, p. 553.

[2] Gunn, Marcus: Trans. of the Internat. Ophthalmic Congress, Edinburgh, 1894; Brit. Med. Jour., 1907, p. 1126.

[3] Parsons, J. Herbert: Pathology of the Eye, London, 1908, p. 1349.

struck on his head by a falling roof; knocked down but not rendered unconscious. Following the accident (although not regarding himself as seriously injured) he complained of repeated severe headaches. During the sixth week he became somewhat apathetic and listless, and lost all interest in his affairs and family. Ophthalmoscopic examination revealed marked blurring of the left disk with hemorrhages, the only apparent change in the opposite eye being a slight enlargement of the vessels.

OPERATION.—An explorative osteoplastic flap over the left hemisphere —selected partially because of the papilledema of the left side—disclosed an enormous hemorrhage into the subdural space covering the entire left frontal and parietal lobes; the hemorrhage having undergone cystic degeneration while the limiting membranes of the subdural space were the site of great thickening and extensive new vessel formation, from which repeated bleedings into the subdural space had occurred.

Hemorrhage into the subdural space, although generally undiagnosed, because of the lack of definite signs of fracture, is one of the most satisfactory traumatic surgical conditions for operative treatment.

The case illustrates its characteristic, viz., (*a*) early lack of definite localizing or pressure symptoms, and (*b*) their later appearance because of degeneration of the blood-clot and new hemorrhages.

A unilateral papilledema may not be diagnostic of the location of the lesion; as I have seen a marked swelling of the nerve-head of the opposite side appear the day following an operation for a frontal lobe abscess, the papilledema undoubtedly being due to the cerebral edema from the trauma of the operative procedure.

Vascular disturbances affecting the venous return from the brain are apt to be associated with a marked blurring of the margin of the disk. This is familiar to otologists in sinus thrombosis of otitic origin.

In a case in which no ear symptoms were present, but an operation for enlarged glands of the neck was followed by acute sepsis, the appearance of papilledema in the eye of the same side led to the diagnosis of septic thrombosis, retrograding from the jugular vein below into the cerebral sinuses above. The opening of the lateral sinus and the turning out of a septic clot was followed by a prompt disappearance of the papilledema.

In another case in which there was no discernible change at the nerve-head before operation, the patient, following a ligation of the jugular vein for sinus thrombophlebitis, on recovery from the anesthetic was found to be

practically blind, with a swelling in both disks of 7 D. The postmortem (held weeks later) disclosed a small jugular foramen of the opposite side and an extensive thrombus of the superior longitudinal sinus which were thought to be the explanation of the choked disk.

A

B

Fig. 464.—A, Large subdural but extrapial hemorrhage. B, Extensive subpial hemorrhage. Pathologic specimens from traumatic cases, illustrating (A) how hemorrhages into the subdural space may cause general increase of the intracranial pressure without marked localizing symptoms, especially if in a silent area (frontal, temporosphenoidal, or occipital lobes); while intra-arachnoid hemorrhages (B) never give signs of increased pressure unless accompanied by brain destruction.

All these apparently conflicting clinical manifestations of the influence of increased intracranial pressure in the production of papilledema have as yet defied explanation, although we have come to look to disturbance of the cerebrospinal circulation as generally the most important factor.[1, 2, 3, 4]

Decompression for the Relief of Papilledema.—Although I have subjected a considerable number of cases of papilledema to decompression operations for the prevention of threatened blindness in brain tumors, and while in many instances the results have been most encouraging, I am inclined to think that this operation will be less and less frequently performed in the future as our methods of diagnosis improve. The profession has been led to regard a subtemporal decompression as a safe procedure notwithstanding the dangers and disappointments that attend it, especially if the obstruction is in the central part of the cerebrospinal fluid system, in which case the operation may only add to the already pitiable condition of the patient.

That I am not alone in such experiences is demonstrated by the fact that I have seen equally distressing conditions at the hands of other surgeons.

To perform a decompression for an extra- or an intradural clot from fracture of the skull is one thing—it is comparatively safe, easy, and may be life-saving, although repeated lumbar punctures[5] with dehydration by magnesium sulphate[6, 7] will

[1] Cushing, Harvey: Studies on the Cerebrospinal Fluid, Jour. of Med. Research, vol. 31, 1914, 1–19.

[2] Weed, Lewis H., and Wegeferth, P.: Studies on Cerebrospinal Fluid, Jour. Med. Research, Boston, 1914–1915, n. s., pp. 21–49, 51–91, 93–111.

[3] Weed, Louis H., and McKibben, Paul S.: Pressure Changes in the Cerebrospinal Fluid Following Intravenous Injection of Solutions of Various Concentrations, Amer. Jour. of Physiology, May, 1919, vol. xlviii, No. 4.

[4] Weed, Lewis H., and McKibben, Paul S.: Experimental Alterations of Brain Bulk, Amer. Jour. of Physiology, May, 1919, vol. xlviii, No. 4.

[5] Jackson, Harry: The Circulation of the Cerebrospinal Fluid, Jour. Amer. Med. Assoc., 79, 1394–1398, October 21, 1922.

[6] Foley, F. E. B.: Alterations in the Currents and Absorption of Cerebrospinal Fluid Following Salt Administration, Arch. Surg., 6, 587-604, Mar.,1924.

[7] Morrissey, E. J.: The Effect of Magnesium Sulphate on Cerebrospinal Fluid Pressure and On Brain Volume, Arch. Surg., 11, 778–789, November, 1925 (charts).

generally control the secondary edema of cerebral trauma. But to perform a decompression for papilledema due to an obstructed cerebrospinal fluid system—and these are the cases that are apt to be associated with threatened blindness—is quite another matter. It should be undertaken only after the most careful consideration of the possible injury to be done, as well as benefit to be derived, and then only by one possessing special experience in cranial surgery.

Direct Pressure on the Optic Nerve in Front of the Chiasm.—Inflammation, abscess, and hemorrhage of the orbit are not apt to cause reduction of visual acuity from pressure on the optic nerve; but very slight pressure on the nerve itself as it passes through the bony optic foramen may cause great loss of sight, which if not early recognized and surgically relieved will rapidly result in permanent blindness.

In fracture involving the optic foramen sudden and generally complete blindness, with secondary optic atrophy, is the rule. The following is a typical case:

> A. D. entered the hospital in a semi-intoxicated condition, with ecchymosis and a superficial wound over the left eye. The next morning he complained of total blindness of this eye. Ophthalmoscopic examination was negative. Several weeks later, however, left optic nerve atrophy was discovered.

As the result of 25 postmortem examinations Callan[1] demonstrated that the line of fracture in such cases always goes through the optic foramen. Van Holder, investigating postmortem fractures of the base of the brain, found that when the optic foramen is involved in a fracture it is generally associated with a hemorrhage into the sheath of the optic nerve.

Knowing that fractures of other parts of the skull without depression in themselves cause no symptoms of degeneration, we may infer that the resulting blindness and optic atrophy in fracture of the optic foramen are from pressure caused by hemorrhage into the sheath.

[1] Callan, Peter A.: Four Cases of Orbital Traumatism Resulting in Immediate Monocular Blindness through Fracture into Foramen Opticum, etc., Jour. Amer. Med. Assoc., March 5, 1892; also report of 9 additional cases in New York Eye and Ear Infirmary Reports, vol. 1, pt. 1, January, 1893.

Surgical Prevention of Blindness Due to Fracture of Optic Foramen.—It was for the possible prevention of blindness (as well as for the treatment and drainage of orbital abscess and the extraction of foreign bodies and tumors behind the ball) that, a few years ago, I suggested[1] surgical interference based on the following case:

B. C., fifty-two years of age, was accidentally shot in the temporal region. On entering the hospital he was in a semicomatose condition, with exophthalmos and chemosis of the affected side, ocular movements limited, hemorrhages into the vitreous, and a muddy appearance of the retina. *x*-Ray revealed a bullet, in two pieces, localized about 7 mm. behind the eyeball, 8 mm. above, and 2½ mm. to the temporal side. An incision was made through the skin, temporal fascia, and muscle, the bone just above the junction of the anterior and middle fossæ perforated, and the dura exposed; through the opening the dura over the roof of the orbit was elevated. The roof of the orbit was removed; the entire orbital contents was thus exposed to view, and both pieces of bullet extracted under direct vision. The patient recovered with useful sight in the affected eye.

Comment.—So far as I am aware, this was the first time that an intracranial route had been employed to enter the orbit. Since that time I have performed the operation a number of times on the cadaver, and once on the living. Although the technical difficulties (chiefly from accidental hemorrhage from injury to the middle meningeal artery) may be great, the procedure furnishes a means of relief from blindness due to fracture of the orbital foramen, with hemorrhage into the sheath. Whether it will fulfil all the requirements in these cases only experience will show.

Pressure in the Optic Foramen.—*Case of Papilledema from Acute Infection of the Sphenoid Sinus (Undemonstrable by x-Ray), with Almost Total Blindness of Both Eyes; Relieved by Drainage of the Sphenoidal Sinuses.*—HISTORY.—R. F., on October 1st, had a coryza, which lasted one week, and then improved. On October 11th she complained of pain over the right eye and frontal headaches. Later she had a sharp pain whenever the eyes were moved to the right, left, up, or down.

October 28th: Patient noticed that she did not see well with the right eye.

October 30th: The vision of the right eye was reduced to ability to see light. No change at nerve-head.

November 4th: Following a chill the pain behind the left eye increased, and the vision of the homolateral eye began to blur.

Examination (Dr. John V. Bissett).—Pupils react to light sluggishly. Both disks blurred, large full veins, no hemorrhages. Right vision: Counts fingers at 1 foot (in upper part of visual field). Left vision: Counts fingers at 7 feet.

[1] Eagleton, W. P.: A Case Showing the Possibility of Exploring the Orbital Contents from Behind Through the Cranial Fossa, Archiv. of Ophthal., 1912, vol. 41, p. 162.

NEUROLOGIC EXAMINATION negative. Blood-pressure, 110/70.

TEMPERATURE has been continuously normal except on one occasion, when it rose to 100.2° F., rectal, and then immediately descended to normal.

BLOOD.—Leukocytes, 6400; polynuclears, 75 per cent.; lymphocytes, 25 per cent.

URINE.—Normal.

Fig. 465.—Case B. C. Foreign body in the orbit 7 mm. posterior to eyeball. (The localizing ball is touching the cornea.)

Fig. 466.—Intracranial but extradural exposure of posterior part of orbit, viz., beneath the dura covering the floor of the anterior fossa and through the roof of the orbit.

LUMBAR PUNCTURE.—Fluid not under pressure; globulin not increased; coagulable albumin, a trace; cell count, 6; chlorid, 0.67; sterile. Wassermann negative.

x-RAY.—Frontal ethmoids and antra are perfectly clear. There is no definite evidence of pathology of the sphenoid region except in the lateral view, where at the posterior portion there is a lack of clearness. "Whether or not this is due to pathology or to dense formation of bone it is impossible to state, but there is not sufficient cloudiness in this region to warrant the diagnosis of sphenoid disease" (C. F. B.).

IMPRESSION.—"The fact that pressure on the eyeball causes pain, especially in the left, while none is present on pressure over the supra-orbital and infra-orbital nerves, would point to its being an infection in the orbit itself."

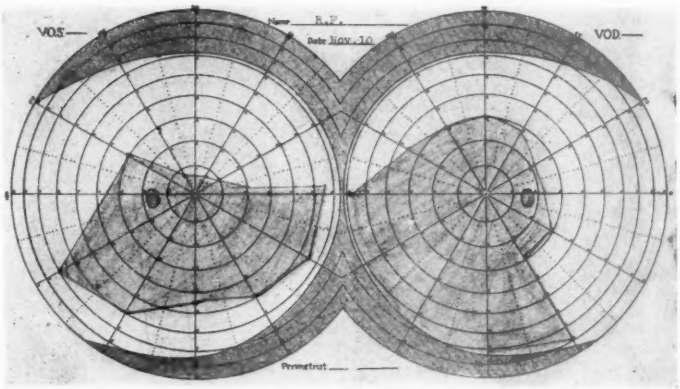


Fig. 467.—Case R. F. Large area of scotoma at time of operation.

November 10th: Today the swelling of both nerve-heads has increased to 6 diopters; no hemorrhages. Vision: Patient is unable to count fingers when looking straight ahead with either eye, but with left eye still sees hand movements at periphery, while in right eye can only see light and dark objects in upper periphery (bilateral large central scotoma) (Fig. 467).

OPERATION.—Both sphenoidal sinuses were opened by reflecting the lip upward and resecting the nasal septum. The right sphenoidal cavity contained bloody fluid; no polypi. The left sphenoidal cavity was empty.

POSTOPERATIVE HISTORY.—Immediately following the operation the vision rapidly returned, and bilateral central scotoma could be easily demonstrated (Fig. 468). One month later no change could be seen at the nerve-head, and the vision in both eyes was normal.

Ligation of the internal or common carotid for the control of arteriovenous aneurysm, the result of rupture of the internal

carotid artery into the cavernous sinus from fracture of the base of the skull, is, in my experience, a most satisfactory procedure, providing the operation is performed before the exophthalmos has become extreme or the intra-ocular hemorrhages so extensive as to destroy the retinal tissue.

J. B. was struck on head in an automobile accident. *x*-Ray of skull was negative. He left the hospital within a few days believing himself not seriously injured. Later he noticed that the buzzing in his head, which he had thought was due to shock, had gradually become louder. His left eye became injected and his vision failed.

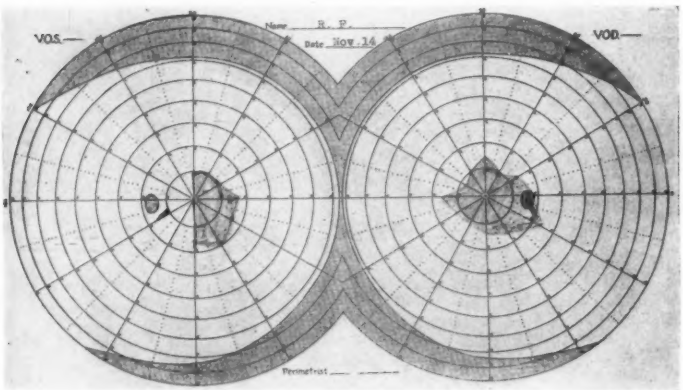


Fig. 468.—Case R. F. Central scotoma a few days after removal of infection in the sphenoid sinus. Later both scotomata entirely disappeared.

Examination (several months later).—Slight exophthalmos. The veins of ocular conjunctiva were dilated and enlarged. Numerous hemorrhages into the retina. A loud bruit could be heard over the temporal region, which was transmitted to other parts of the head. The bruit disappeared on pressure over the carotid region in the neck.

Operation.—Ligation of the internal carotid with fascia lata was followed by the rapid disappearance of all ocular symptoms and recession of the eye to its normal position.

Comment.—I have operated in 8 similar cases, and in all except one the operation has been followed by a complete or partial disappearance of all symptoms.

Pressure Between Optic Chiasm and Primary Optic Centers.—For a long time ophthalmologists and neurologists disagreed

as to the presence of Wernicke's symptom. Walker,[1] conclusively proved that such a symptom does exist. Personally, I have demonstrated its presence by a combination of instruments and was thus materially aided in the exact localization of the lesion.

Fig. 469.—Case J. B. Disturbance of the return venous flow from the orbit—exophthalmos and dilated conjunctival veins—the result of arteriovenous aneurysm from fracture of the base of the skull.

However, in surgical cases I have not been able to differentiate between the hemianopsia from cortical occipital lobe lesions and that due to direct pressure on the optic tract behind the primary optic centers, but I am persuaded that careful examination will often make possible such a diagnosis.

Pressure Between the Primary Optic Centers and the Visual Cortical Centers.—After leaving the primary optic centers the optic tract passes directly backward through the posterior limb

[1] Walker, Clifford B.: Further Observations on the Hemiopic Pupillary Reaction Obtained with a New Clinical Instrument, Jour. Amer. Med. Assoc., September 5, 1914, p. 846; also Topical Diagnostic Value of the Hemiopic Pupillary Reaction and the Wilbrand Hemianopic Prism Phenomenon with a New Method of Performing the Latter, Jour. Amer. Med. Assoc., September 27, 1913, p. 1152.

of the internal capsule and lies in intimate association with the motor and sensory tracts. From the internal capsule the fibers of Gratiolet pass along the outer wall of the descending horn of the lateral ventricle and are distributed to the optic cortical centers, both sensory and psychic, around the cuneus of the occipital lobe. In its course backward the optic tract is thus in intimate contact with two important parts, the internal capsule and the descending horn of the lateral ventricle.

Hemianopsia, as is well known, is a frequent accompaniment of hemiplegia and hemianesthesia in apoplexy of the internal capsule. I have seen one case in which hemianopsia preceded hemiplegia by many hours. However, it is not generally recognized that apparent apoplexy of the internal capsule may occasionally be due to abscess, the result of vascular occlusion by an infected embolus from a distant part.

A woman, fifty-three years of age, eighteen hours after a mastoid operation suddenly became partially hemiplegic and hemianesthetic, with a complete bilateral hemianopsia. Seven weeks later I evacuated a small abscess at a depth of 7 mm. from the surface. The abscess was pressing on, if not involving, the internal capsule. Following the operation the hemianopsia disappeared almost immediately, although the hemiplegia continued.

Pressure at the Visual Cortical Center in the Occipital Lobe.—Hemianopsia is not an infrequent occurrence in cases in which the pressure involves the visual cortical center in the occipital lobe. Repeated testing of the visual field may reveal an unsuspected hemianopsia and thus lead to a localization of the lesion.

In a case of fracture of the skull with hemiplegia and hemianesthesia associated with extra- and intradural hemorrhage, hemianopsia was still present four years after the injury despite the entire disappearance of all motor and sensory disturbances. *x*-Ray and operation revealed a large traumatic cyst, which involved the occipital lobe extending inward from just within the dura and connected with the lateral ventricle (Fig. 470).

Comment.—Although the man undoubtedly had had hemianopsia from the time of the injury, he was unaware of its existence until it was discovered at the examination (Fig. 471).

Traumatic Abscess of Occipital Lobe Unlocalized Because of Failure to Test the Visual Field Early in the Disease.—HISTORY.—A boy fell from a hammock, striking the back of his head. He felt dizzy for a few minutes

Fig. 470.—Large traumatic cyst of occipital lobe under bone defect, causing typical hemianopsia not appreciated by patient.

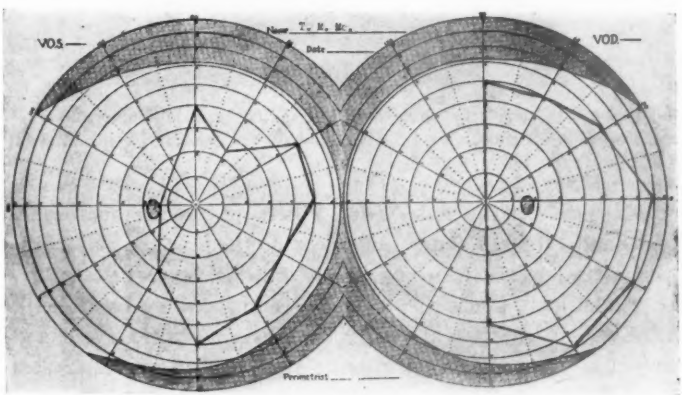


Fig. 471.—Complete bilateral hemianopsia unsuspected by patient, although present for four years from traumatic cyst of occipital lobe.

For several days following the accident he was regarded as well, attended school, but complained of his head. Some days later he began to have severe headaches; double vision appeared and his sight rapidly failed. Examination of the fundus disclosed an increasing papilledema. On admission to the hospital (several weeks after the injury) he was semiconscious and almost blind; it was impossible to take a visual field not only because of poor sight from the excessive swelling and hemorrhage of the nerve-head but also because of his mental state. *x*-Ray of skull was negative. Lumbar puncture showed fluid under pressure, with a high cell count without bacteria. Diagnosis: Unlocalized traumatic brain abscess with basilar meningitis. Sudden death in convulsions.

Autopsy revealed a large abscess in the left occipital lobe (Fig. 472).

Comment.—If the fields had been taken at an early period, before the loss of vision, they undoubtedly would have disclosed a complete bilateral hemianopsia, which would have localized the lesion.

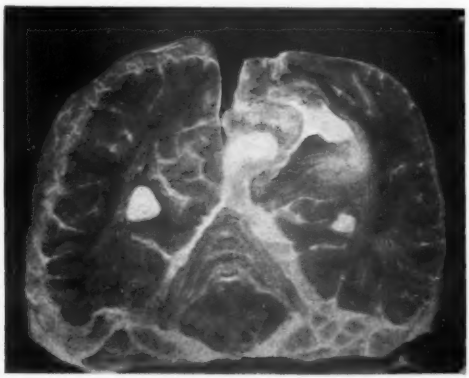


Fig. 472.—Large traumatic abscess of the occipital lobe unlocalized because of failure to take visual fields before patient became blind and semicomatose.

Pressure On the Association Fibers of the Temporosphenoidal and Frontal Lobes.—After leaving the primary centers the optic radiations of Gratiolet pass backward through the temporosphenoidal lobe, where they may be seen as a white band in the outer wall of the lateral ventricle—Meyer's tract. The hemianopsia so frequently seen in temporosphenoidal abscess is due to the fact that the optic fibers are caught between the overdistended lateral ventricle and the inflexible dura and bone. Consequently, hemianopsia, or hemianopic indentations of the

visual fields, are a frequent accompaniment of traumatic lesions and of abscess of the temporosphenoidal lobe, usually without the patient being aware of the visual defect. This has occurred in numerous cases under my care. Also, as the visual-field defect in temporosphenoidal lobe abscess may be caused by a reactive edema surrounding the lesion itself, a complete bilateral hemianopsia, or hemianopic indentations of a quadrant of both fields, may be present at one time and absent at another (Fig. 473). Therefore it is necessary that the fields be taken repeatedly in all traumatic and infective lesions of the temporosphenoidal lobe.

Moreover, because of the delicacy of the mechanism necessary to produce a visual-field defect in this region, very slight relief of the pressure may suffice to relieve the hemianopsia.

This was demonstrated in a case of traumatic cyst, in which, during the first stage of an exploration following the removal of bone and before the dura had been opened, the hemianopsia was found to have largely disappeared.

Case of Encapsulation of Foreign Body in Associated Visual Fibers—Following Bullet Wound of the Brain—with Conversion of Compound Comminuted Infected Wound Into Simple Aseptic Incision by Débridement, Thus Permitting Primary Closure.—HISTORY.—S. S., a police officer, was shot, the bullet entering above the left eye and passing through the frontal sinus into the brain.

On admission to the hospital the patient was in an unconscious state, from which he rallied and regained consciousness.

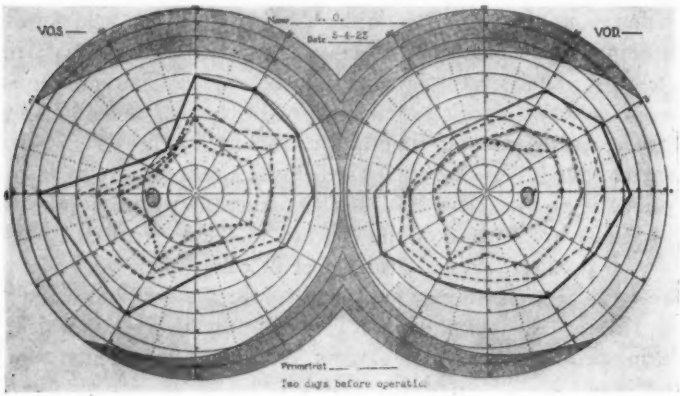
EXAMINATION showed a paralysis of his left forearm. Slight exophthalmos of the left eye. The patient had a nystagmus of both eyes to the right and was unable to move his left eye to the left. Ophthalmoscopic examination: Both disks white, with full veins. There were numerous hemorrhages into the right disk. *x*-Ray revealed three pieces of bullet, one in the ethmoids, one in the frontal lobe at a distance of 1 inch behind the anterior pole, and the third in the occipital region (Fig. 474).

OPERATION (under local anesthesia).—Débridement of infected skin and bony wounds. Under almost continuous irrigation numerous pieces of bone and part of the bullet lodged in the cerebral substance of the frontal lobe were removed as they presented themselves at the surface by having the patient cough repeatedly, the brain thus expelling them from its interior.

No attempt was made to find the piece of bullet in the ethmoids, or to extract the larger piece in the occipital lobe because of its depth from the cortex. Tight skin closure thus converted an infected comminuted and depressed fracture into a simple one.

Uninterrupted recovery without elevation of temperature above 100° F.

Seven months later: The patient regarded himself as perfectly well, but still had numbness in the left little finger. Ocular movements were normal. Ophthalmoscopic examination showed scars of former hemor-



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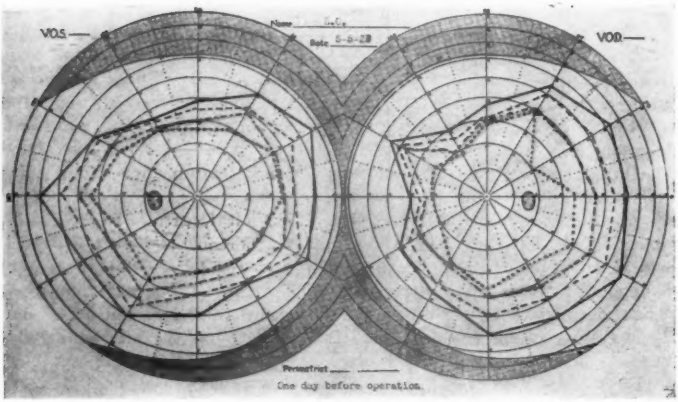

B

Fig. 473.—Charts showing the variations in hemianopic indentations in inflammatory edema, and consequently the necessity of taking repeated visual fields in infective lesions. A, Visual fields showing definite hemianopic indentations (and thus localizing the lesion) in a case of temporosphenoidal lobe abscess two days prior to operation. B, Visual fields of the same case on following day with indentations greatly reduced, probably because of the subsidence of edema and of readjustment of the pressure.

rhages. Vision normal, but there remained an indentation of the visual field of the homolateral side (similar to Fig. 473).

Eighteen months later (while apparently in perfect health) he was upset in an automobile and died instantly.

COMMENT.—There is a possibility that the bullet within his brain (which had given him no symptoms whatsoever) may have contributed to his death, as the three other occupants of the car were uninjured.

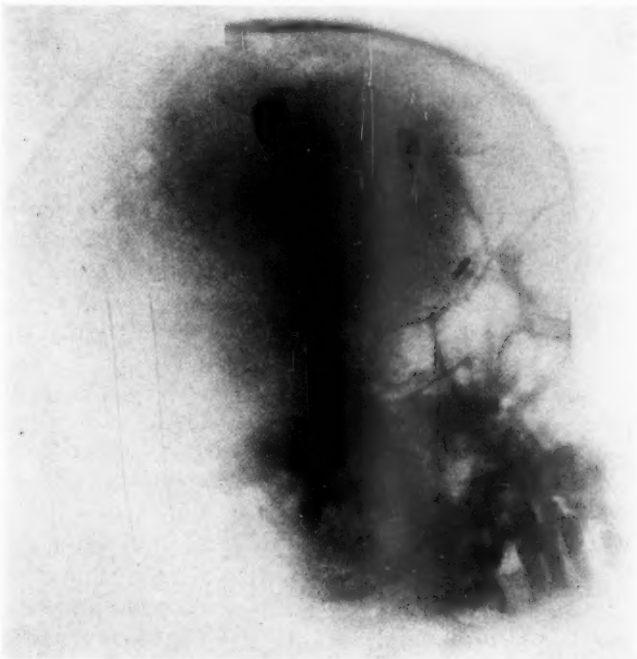

Fig. 474.—*x*-Ray of S. S. Anterior piece of bullet in frontal lobe expelled by coughing of patient.

Conclusions.—In conclusion I would plead for a more uniform ophthalmologic and otologic investigation of all the general medical and surgical cases in the wards of our hospitals. Every general hospital should make its ophthalmologic and otologic departments an integral part of the general surgical service itself, not, as is but too usual, to be consulted only when

requested by the surgeon in attendance. Every injury to the head, every medical or surgical case presenting neurologic symptoms should be reported routinely to the ophthalmologist and the otologist immediately on admission of the patient to the hospital. By their continued co-operation I am certain that the early diagnosis and consequently successful treatment of many intracranial lesions would be materially advanced.

CLINIC OF DR. C. RUTHERFORD O'CROWLEY

NEWARK CITY HOSPITAL

TREATMENT OF EPITHELIOMA OF THE PENIS WITH COLLOIDAL LEAD AND SURGERY

FOR the past six years Professor W. Blair Bell (Liverpool) has been treating cases of human cancer with the intravenous injection of colloidal lead. It is the consensus of opinion of such critical observers as Adami, Wood, and others that in scattered cases he has been able to arrest, for a period of from one to five years, inoperable carcinomas and sarcomas that have resisted every other form of treatment, such as surgery, radium, and *x*-ray.

This is the first time, therefore, that a chemical has been found to have any inhibiting effect upon human cancer, and it revives interest in a possible chemotherapy of cancer which subject has practically been discarded for a number of years.

The present Bell treatment consists of injections made intravenously in quantities not to exceed 100 mg. of lead per dose. During the two or three months that are required for the treatment about 600 mg. of lead are given.

Results are hardly ever obtained by Bell until the patient is brought to the verge of acute lead-poisoning. During this treatment there are often marked changes in the blood, punctate basophilia being the earliest sign of lead intoxication. After the injection of lead the erythrocytes often fall so low that blood transfusions may be necessary to save the patient. During the treatment nausea and vomiting are common. Lead colic is common when massive doses are used. Albuminuria, edema, and nitrogenous waste retention and even complete anuria is frequently seen and has sometimes caused death.

Bell has attributed the effect of colloidal lead to a selective affinity for lead on the part of the cancer cell due to its high phosphatide content. The method of preparing his lead has been published. On account of its unstable character and the numerous dangers in its use, many of the details are apparently withheld, and it could not be given out to the profession for use.

Bell has stated: "We have no doubt that the preparation of lead in colloidal form for intravenous injection will be vastly improved or lead be administered in another form; and we recognize the fact that some other substance may be found to act in the same way as lead on malignant neoplasia, but with less toxicity toward the other tissues of the body."

Working upon the idea that a more stable and apparently less toxic lead would give even better results than the Bell lead, Von Sochocky, working with Martland in the Pathologic Department of the Newark City Hospital, was able to make a very stable colloid of lead. This colloid is prepared by well-known chemical methods and consists in reducing suitable lead salts by intense reducing substances in the presence of a catalyzer. The proper temperature, dilution, and time of the reaction controlling the uniformity and size of the colloidal particles is maintained. The final preparation has the same strength as that of the Bell lead.

In January, 1926 Drs. Martland, Von Sochocky, and Hoffman began the treatment of cancer cases with their colloid. Their work is being reported in detail elsewhere.

As the lead situation is becoming very acute at the present time, it seemed that it might be of interest to report the treatment of 2 cases from my service by this stable colloidal lead and to give you an idea of the conclusions of Drs. Martland, Von Sochocky, and Hoffman in their work.

I have 2 cases of epithelioma of the penis to present to you today. Both cases have had a thorough course of treatment with colloidal lead. They have also been treated with radium. Case I is moribund and beyond any surgical interference, while on Case II we expect to do a radical operation this morning.

Case I.—W. K., colored man, aged forty-five years. You see here an extensive cauliflower carcinoma of the penis which has destroyed the entire glans penis and half of the organ itself. There is bilateral involvement of the inguinal nodes, the largest being the size of a walnut. He is bedridden. The hemoglobin is 18 per cent. and the erythrocytes 1,000,000. He has had one direct blood transfusion. He has received during a period of seven weeks' treatment 1874 mg. of a stable colloidal lead, being injected intravenously twice a week in doses ranging from 20 to 200 mg.

Fig. 475.—Liver from Case I. The enormous deposits of colloidal lead may be noted in the Kupfer stellate cells. In none of the sections from the epithelioma or from its metastases is any visible lead seen. (Collection of Dr. Martland.)

During the early part of this treatment his general condition improved so that he could walk around the wards. His hemoglobin reached 41 per cent. Most of the end of the cancer sloughed off, leaving a clean base, but showing a hard infiltration of the penis down to the pubes. Toward the end of the treatment he showed a marked punctate Burtonian line and a few stippled erythrocytes. He had several hemorrhages from the sloughing growth. His anemia became progressive and the

icterus index was 15, with a weak indirect van den Bergh test. He died two and one-half months after the lead treatment was finished.

Autopsy.—Showed extensive metastases to the pelvic and lumbar nodes. The large part of the penis had sloughed off, leaving a hard carcinomatous infiltration of the stump close to the pubis.

The most noteworthy changes aside from the extreme emaciation was seen in the spleen and liver. The spleen was only slightly enlarged and a peculiar slaty color. On section a slaty brown umber color was seen not encountered in any other known lesion of this organ. The liver also had a suggestive slaty color.

Histology.—Sections showed enormous deposits of colloidal lead in the histiocytes of the spleen, liver, and bone-marrow. In the spleen a large amount of lead was also seen lying loose in the sinuses. In none of the sections of the original growth or in the metastases was visible lead found in the tumor cells.

Toxicology.—Chemical examination showed the lead stored in the spleen, liver, and marrow. The findings are tabulated in Table 1.

TABLE 1

CHEMICAL ANALYSES OF ORGANS IN CASE I

Organs.	Weight of tissue examined.	Amount of lead found, mgs.	Amount of lead found, per cent.
Penis	35 gm.	Nil	Nil
Liver	190 gm.	75.84	0.07979
Spleen	70 gm.	3.14	0.00448
Bone	50 gm.	2.44	0.00488

In this case the diminution in the tumor can be entirely explained by the natural history of such growths, where sloughing off of large pieces leaving a clean base is frequently seen. There is no direct evidence that lead has had any inhibiting effect. Histological examinations show no selective affinity of the cancer cells for lead, and this is supported by toxicologic examinations which show no lead in the tumor tissues.

The deposits of lead in the liver, spleen, and bone-marrow where they are phagocyted as particulate foreign matter by the histiocytes shows the importance of the reticulo-endothelial system in ridding the blood-stream of foreign particles. In addition, the storage of lead eventually resulted in an acute plumbic anemia which could not be controlled when once it manifested itself.

Case II.—E. W., negro, forty-six years of age. He has an epithelioma of the penis involving the corona and about 3 inches of the shaft. The inguinal nodes in both groins are

Fig. 476.—Case II. Three weeks after operation, showing a granulating wound.

enlarged. Biopsy showed squamous-cell epithelioma. The growth has been needled with radium without any apparent benefit. He has received 1335 mg. of lead, usually given three

times a week, in doses ranging from 100 to 150 mg. In the early part of the treatment the growth diminished to one-half of its original size and the inguinal nodes became smaller. His blood improved, the hemoglobin reaching 75 per cent. and the erythrocytes 5,500,000. Physically he felt better. Toward the end of the treatment a lead line was noticed and he showed increasing pallor. His hemoglobin dropped to 39 per cent. and many stippled cells were seen. The growth was smaller, cleaner, and more fibrotic. He gradually survived the plumbic anemia after detoxicating methods had been instituted and a radical operation was decided upon.

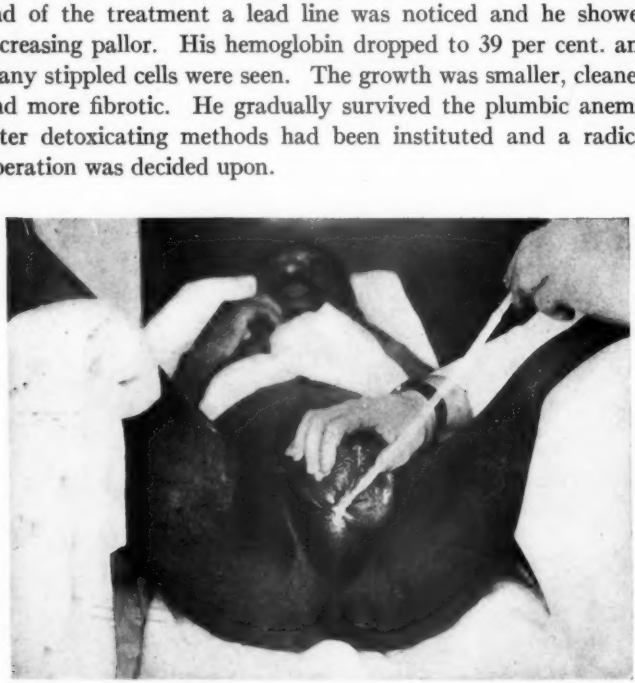

Fig. 477.—Case II. White catheter through transplanted urethra in perineum.

Operation.—For this type of operation we follow the method as described by Dr. J. H. Cunningham of Boston. A condom is placed over the penis to prevent implantation of cancer cells during operation. A sweeping U-shaped incision is made, beginning slightly above and to the inner side of the anterior spine on one side, downward in the fold of the groin to the root of the penis, and upward on the other side. This incision passes just

through the skin and outlines an apron which is dissected upward. An incision passing just through the skin is made downward over Scarpa's triangle from the center of Poupart's ligament. The skin is dissected inward and outward, making two flaps. Beginning at the top of the abdominal incision, the fat which contains lymphatic channels is dissected in one mass from the abdominal fascia. This dissection is carried downward into Scarpa's triangle on either side. The superficial nodes are removed still embedded in the fat if possible. Hemorrhage during the abdominal portion of the dissection is slight, but as the dissection is carried over Poupart's ligament into Scarpa's triangle the superficial epigastric, the superficial circumflex, and the superficial external pudic vessels must be secured beneath the fat mass as they come through the fascia. If the node involvement is marked, the growth may extend as one mass through the fascia lata into the deep inguinal nodes, in which event the fascia is divided. The sartorius is drawn outward if necessary and the involved nodes freed from the femoral vessels. Poupart's ligament may be divided to continue the dissection into the crural canal. If the mass is not continuous from the superficial to the deep nodes, the fascia lata is divided and the deep nodes freed from the femoral vessels and removed.

The patient is now placed in the lithotomy position. An incision is begun at the root of the penis passing around both sides, uniting beneath, and continuing along the raphé of the scrotum, bisecting it. The suspensory ligament is divided and the dorsal vessels of the penis secured. The penis with the attached fat mass from the abdomen and groins is drawn downward. The dissection is carried on until the attachment of the crura to the pubic rami are met. These are clamped close to the bone and cut away. The stump is transfixed and tied and no hemorrhage results. It is necessary to clamp, transfix, and tie, for the arteries to the crura may otherwise retract and cause troublesome hemorrhage. Then the corpus spongiosum is freed at a distance of about $\frac{3}{4}$ inch in front of the bulb and cut across at this point unless the membranous urethra seems sufficiently long. It is better to leave too much than too little

urethra. The whole mass, the abdominal and inguinal fat containing lymphatics and nodes, the penis and the crura, are then removed in one mass. The cut end of the urethra is then stretched to the lower part of the perineal incision, leaving about ¾ inch of it protruding beyond the surface. This is cut away about ten days later, after the incision has closed, and stricture is less likely to result. A self-retaining catheter is placed through the urethra into the bladder. A drain is placed in the perineum, also in the wound of the abdominal skin apron on either side, and in the incision in both Scarpa's triangles. The suturing of the scrotum, so that it is lifted upward, so that it will not become soiled by urine is important.

Histology.—Histologic examination of the specimen removed at operation showed extensive carcinomatous infiltration of the corpora cavernosa. The inguinal nodes showed no metastases and their previous enlargement must have been inflammatory. There were no deposits of the visible lead in the tumor cells.

This case showed under the lead treatment considerable shrinkage in the size of the tumor. How much must be attributed to the needling with radium, how much to continual applications of cleansing solutions, and how much to lead is questionable. There is no direct evidence that lead had any beneficial effect. In addition, the patient nearly died from plumbic anemia. Histologic examination showed no visible lead in the tumor.

Fifteen cases of inoperable carcinoma and sarcoma have been treated by Martland, Von Sochocky, and Hoffman by this colloidal lead. In no case did they observe any inhibition or diminution in the original cancer or in its metastases, and they have shown by autopsies on 8 cases that a stable colloid of lead does not reach the tumor in any demonstrable amounts, but the lead that is not rapidly eliminated by the kidneys, etc., after the intravenous injection is taken out of the blood-stream by the histiocytes of the reticulo-endothelial system and deposited in its main organs, the spleen, liver, and bone-marrow, where it gradually produces an intractable plumbic anemia that usually resists all detoxicating methods.

They question the theory of a selective affinity of the cancer

cells for lead and attribute the results of the Bell lead to its unstable form and irritating qualities which causes it to produce thrombosis in the tumor with subsequent necrosis in some cases, with the addition of a possible toxic effect on the cancer cells from the adsorption of ionic forms of lead.

They believe that Bell has produced some results with his lead, and deserves an enormous amount of credit for reawakening the subject of chemotherapy in cancer, but the promiscuous use of any lead preparation by the profession at this time would cause innumerable deaths and bring discredit to the whole situation. Every preparation of lead will have a toxicology of its own.

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CLINIC OF DR. CHARLES M. ROBBINS

NEWARK BETH ISRAEL HOSPITAL

PERFORATED GASTRIC AND DUODENAL ULCER

THE patient we are about to operate was admitted to the hospital 8.30 this morning with the following history:

B. O., female, white, age twenty-nine, housewife by occupation.

Chief Complaint.—Generalized abdominal pain.

Family History.—Negative.

Past History.—Typhoid fever at nine. Influenza seven years ago.

Menstrual History.—Began at eleven. Periods in last few months irregular, lasting four to seven days, and often coming twice monthly. Last period eight days ago.

Obstetric.—Gravida 3. Para 2. Normal labors. One miscarriage. No curettage.

Present Illness.—Dates back eleven months, when patient began to have abdominal pain. This pain was localized to the right side of lower abdomen, constant, and not relieved by food. No vomiting or belching. At this time she claims she had temperature and had ice-bags applied to her abdomen. Six months ago she had another attack. Diagnosis at this time, appendicitis. Last night at 1.30 A. M. had a severe attack of pain localized to the right lower quadrant. Vomited once. Pain at this time a little more severe than previous attacks and more sudden in onset. Best weight 135 pounds, present weight 85 pounds.

Physical Examination.—Patient looks acutely ill and shows a pronounced pallor of face. There is rigidity and tenderness over the entire abdomen, but most marked over McBurney's point. Marked rebound tenderness. Vaginal examination negative except for tenderness to pressure over right fornix.

Temperature, 100° F. Pulse 86.

Laboratory.—Urine negative.

Blood, total count, whites, 11,400; poly., 86 per cent.; lympho., 13 per cent.; endoth., 1 per cent.; hemoglobin, 75 per cent.

Preoperative Diagnosis.—Acute appendicitis.

Operation.—Gas-oxygen-ether anesthesia 4 P. M., seven and a half hours after admission. Right transrectus incision. Free fluid in abdomen. Right gutter, including appendix, entirely covered with exudate. At prepyloric region there is a definite perforation the size of a head of a match. Opening covered with exudate, but no adhesions or marked tumefaction present. No free food in abdomen. Appendix removed. Gastrorrhaphy performed, using

No. 1 chromic catgut as a double purse-string suture and covering of perforated area with omentum. Two drains inserted, one in pelvis and one at site of rupture. Abdomen closed in layers.

Postoperative Diagnosis.—Acute perforated duodenal ulcer.

Having concluded the operation, we are now in a position to look over our data and come to some conclusions. The facts as presented in our history and physical examination justified a diagnosis of acute appendicitis, and yet, in view of our findings, it is evident that we have failed in our diagnosis. It is of interest to note that the physician who attended this patient for the two previous attacks tells me that her symptoms at that time were typical of appendicitis. Her present attending physician informs me that a diagnosis of possible ectopic gestation was made by a consultant surgeon. This patient, you see, has had a number of doctors who are all more or less sure of the diagnosis of appendicitis. The reasons for our failure are the imperfect gastric history and the complete absence of the board-like rigidity which, to my mind, is one of the most important physical findings in this condition. The finding of the ulcer makes me speculate as to the actual nature of the pathology present in the two previous attacks. The absence of adhesions and tumefaction around the ulcer seems, in my opinion, to rule out the possibility of previous attempts at rupture. The probability is that the patient had repeated attacks of appendicitis, but whether the appendix is the underlying cause of the ulcer we are unable to state. The pathologic examination of the appendix will help us considerably in this determination. If our opinion about the appendix is correct we should see definite changes in the mucosa aside from the acute reaction of the serosa resulting from the beginning peritonitis. We will send the specimen to our pathologist and await his report with interest.

At our hospital I have been able to gather 25 cases of perforated ulcer which represents a group experience of five years, and judging from the results one is safe in defining perforated ulcer as a formidable and not infrequent emergency in abdominal pathology.

Our conclusions based on the 25 cases leaves us of the opinion

Number. | Name. | Age. | Sex. | Nativity. | Duration of previous symptoms. | Hours elapsed before operation. | Location. | Type operation. | Operative results. | End-results.

Number.	Name.	Age.	Sex.	Nativity.	Duration of previous symptoms.	Hours elapsed before operation.	Location.	Type operation.	Operative results.	End-results.
1	W. B.	38	M.	German	Unobtainable. In extremis.	9½ hours	Pylo.	Caut-orraphy	Death.	
2	J. D.	40	M.	Polish	Coma.	24 hours	Pylo.	None.	Death.	Autopsy.
3	H. S.	35	M.	Hebrew	8 years	6 hours	D.	C-orr.	Recovery.	Death 6 months, pneumonia, intestinal obstruction.
4	S. B.	32	M.	Polish	None.	5½ hours	G.	C-orr.	Recovery.	Pain in 1 year, no operation.
5	L. E.	36	M.	Hebrew	4 months	3 hours	D.	C-orr.	Recovery.	Pain in 1 year, gast-ent. O. K.
6	G. L.	58	M.	German	16 years	9 hours	D.	C-orr.	Death.	
7	J. P.	35	M.	Hebrew	4 days	6 hours	G.	C-orr.	Recovery.	O. K.
8	G. H.	25	M.	Irish	18 months	6 hours	D.	C-orr.	Recovery.	O. K.
9	S. G.	42	M.	Hebrew	None.	12 hours	G.	Orr.	Death.	
10	M. S.	32	M.	Hebrew	6 months	6 hours	D.	Orr.	Recovery.	O. K.
11	A. D.	40	M.	Hebrew	3 years	4 hours	D.	Orr.	Death.	Six weeks. T. B. peritonitis.
12	L. T.	45	M.	Hebrew	10 years	12 hours	D.	Orr.	Death.	Three weeks. Duodenal fistula.
13	W. F.	48	M.	American	?	6 hours	G.	C-orr.	Recovery.	Not traced.
14	L. W.	26	M.	Hebrew	5 years	4 hours	G.	Orr.	Recovery.	Pain 3 years lat. gastro-ent.
15	N. Y.	38	M.	Hebrew	3 years	8 hours	D.	Orr.	Death.	
16	I. Y.	40	M.	Hebrew	6 months	48 hours	D.	Orr.	Death.	
17	L. H.	48	M.	Hebrew	2 years	7 days	D.	Orr-gas-en.	Death.	
18	E. S.	24	F.	American	6 years	3 days	G.	Orr-gast-ent.	Recovery.	Pain in 1 year.
19	B. R.	29	F.	Hebrew	1 year	14 hours	D.	Orr-append.	Recovery.	O. K. 9 months P. O.
20	M. C.	24	M.	Colored	3 years	3 hours	G.	Orr.	Recovery.	Pain 6 months gastro-ent.
21	G. M.	51	M.	American	6 months	8 hours	D.	Orr.	Recovery.	O. K.
22	G. G.	41	M.	American	7 years	3 hours	G.	Orr.	Death.	
23	A. G.	51	M.	Hebrew	4 months	7 days	G.	Orr.	Death.	
24	S. F.	52	M.	Hebrew	5 years	14 hours	G.	Orr.	Death.	
25	G. B.	28	M.	American	1 year	8 hours	D.	Orr.	Recovery.	O. K.

that it is essentially a condition occurring in the male in spite of the fact that 2 of our cases were in females. The relative incidence of ulcer in males is given as three to four times that of females, but in spite of its comparative infrequency it should be given careful consideration in acute abdominal disease of females. In the case I have just operated it is possible that perforation was not considered because of the sex of the patient.

The average age in our patients admitted with this condition was thirty-eight, which is in accord with the reports of Steichele[1] and Meyer-Brams.[2] The latter make the point that age is an essential consideration in the differential diagnosis because of the frequency of acute appendicitis in young adults.

The duration of symptoms previous to operation varies in different individuals in our series, from one who had no symptoms at all to one who suffered sixteen years. This point has been one of controversy, Moynihan stating, "The perforation of an ulcer is a catastrophe which never comes unannounced." Müller-Ravdin,[3] on the other hand, claim that an ulcer can exist without pain, and where an ulcer exists rupture is possible. Gibson, C. L.,[4] states that 25 per cent. of cases of acute perforation give no digestive disturbances previous to perforation. In Case 4 we have such an instance. Patient on admission had a classical picture of acute perforation, yet on the closest questioning denied ever having any gastric or intestinal disturbance of the slightest degree. The average duration of symptoms in our cases was three years previous to rupture, and it is of interest to note that most of our patients never consulted a physician previous to perforation. Several of our cases had been told of the existence of an ulcer, but at this time I can think of no case that had a complete diagnosis. *x*-Ray et al. No patient, to my knowledge, received any medical attention worthy of consideration previous to perforation. The reason for this is that our patients are drawn from the poorer classes who have neither the time nor

[1] Arch. f. klin. Chir., 1923.
[2] Amer. Jour. Med. Sciences, 1926.
[3] Annals of Surgery, 1921.
[4] Amer. Jour. Med. Sciences, 1923.

the money to undergo careful medical management, and who only call the doctor when it is impossible for them to continue with their duties.

The cause of the actual rupture is a matter of speculation. Patients will attribute the intense pain to food taken just previous to perforation, while others claim intensive work, either occupational or athletic, to be the cause. We have seen cases perforate at night in patients that have had a light repast before retiring and who performed no manual labor for some time previous. In most cases perforation occurs three to four hours after eating and may have been caused by the excessive contractions of an empty stomach.

The clinical features of the acute perforation are fairly constant in all cases, sudden sharp agonizing pain in the epigastrium, occasional vomiting, marked tenderness, and the characteristic board-like rigidity. At this stage the diagnosis is not difficult, and it is observed that our interns after seeing one case in the receiving room will make the correct diagnosis. In the cases where the perforation is of long duration, with its consequent extensive chemical peritonitis, diagnosis between perforation, gall-bladder rupture, and acute appendicitis is often difficult.

In the late cases the diagnosis is almost entirely obscured by the peritonitis, and at this time intestinal obstruction and pancreatitis are often mistaken for perforation. The most common error as seen from the cases admitted to our service has been acute appendicitis.

One will occasionally meet with a case of a small perforation of a pyloric ulcer that is not accompanied by the classical symptoms and typical history of a perforated ulcer. There may be a history of sudden onset, sharp pain, and localized rigidity in the right hypochondrium that is not generalized and is not board-like in rigidity. The pain and rigidity having a tendency to remain localized, one is likely to make a diagnosis of acute cholecystitis. When this diagnosis is made one is likely to defer operation for a few days with the idea of permitting the acute symptoms to subside. A patient under these circumstances may recover spontaneously and the ulcer may remain

quiescent for a long time. It seems to me that where there is a history suspicious of ulcer with sudden onset of symptoms simulating gall-bladder disease it is safer to operate at once. A case I have had under my care will illustrate this point: Case 17. L. H., forty-eight, was admitted to hospital with chief complaint of marked pain in abdomen associated with vomiting. His history dated back two years, when he began to have attacks of pain and eructations after meals. This was occasionally followed by vomiting. On the day of admission his pain was very intense and was associated with vomiting. Physical examination showed a moderately emaciated individual presenting moderate rigidity and tenderness in the epigastrium and right hypochondriac region. · Temperature 99° F. Pulse 85. Blood-count, total whites 18,000. Polys. 77 per cent. Because of the pain in the right hypochondrium a diagnosis of cholecystitis was made and operation delayed. Patient was in the hospital one week, showing some improvement except for the persistent pain in the right upper quadrant. The pain not being relieved by our medical efforts, we decided to operate and, if possible, remove his gall-bladder. Laparotomy showed a perforated duodenal ulcer which was covered with adhesions. These adhesions were separated, ulcer cauterized, sutured, covered with omentum, and gastro-enterostomy performed. Gall-bladder found normal. Patient died in forty-eight hours of a definite peritonitis. It seems to me the best time to have operated on this patient was at the onset of his symptoms or at a much later date after medical treatment was instituted to build up the patient. As was shown at the operation, nature had made a strong attempt to close the perforation, and would have succeeded had we not interfered with her efforts.

The differential diagnosis between intestinal obstruction, acute pancreatitis, and perforation are not always easily made. There are, however, a few striking points of differentiation. The marked abdominal distention in the late case of obstruction is not associated with nearly the same degree of abdominal rigidity that one finds in perforation. The abdomen is doughy in consistency and the vomiting a little more pronounced. The marked

general toxemia and shock that are usually associated with acute pancreatitis even in its early stages is more pronounced than in ulcer. The temperature and pulse rate are quite different. It is unusual in our experience to find a temperature over 100° F. and a pulse over 90 in the acute perforation, while in the pancreatitis the pulse becomes very rapid and the temperature reaches 104° to 105° F. soon after the onset of the disease.

While we caution our house staff to be on the lookout for the acute abdomen, particularly perforated ulcer, we occasionally find an intern who will cause us untold anxiety by being overzealous with his history and not zealous enough with his physical examination, as this case will illustrate:

Male, age thirty, was admitted with the following history: One hour before admission had dinner consisting of hamburger steak, vegetable, and beer at a restaurant not usually patronized by the élite. On his way home he was taken with sudden abdominal pain, followed by collapse. The intern who saw this man in the receiving room and obtaining the above history concluded that the patient had what is commonly called ptomain poisoning, and ordered 1 drop of olei tiglii, which was given. Patient was seen one-half hour later by attending surgeon, who performed immediate laparotomy, finding a perforated ulcer. The patient died ten days later of a persistent diarrhea which could not be controlled.

The prognosis in great measure depends upon the time of operation. This has been definitely proved by many observers who report large series of cases. In our 25 cases the 13 that remained well after operation were operated in the six-hour period, while those that died came to operation at an average, of fifteen hours after perforation. Although two of our cases died after being operated three to four hours after perforation (Cases 11 to 22) it is a safe dictum that the surgical abdomen even with obscure diagnosis should be operated upon as soon as possible.

In operating on these cases of perforation we prefer simple gastrorrhaphy following Balfour's technic (Figs. 478–480).

All our cases are drained. We have not as yet the courage

of closing these wounds tight even in the absence of actual food products being present in the abdomen. We are of the opinion in this hospital that complicated operations at the time of the perforation are to be avoided and are best left for later periods.

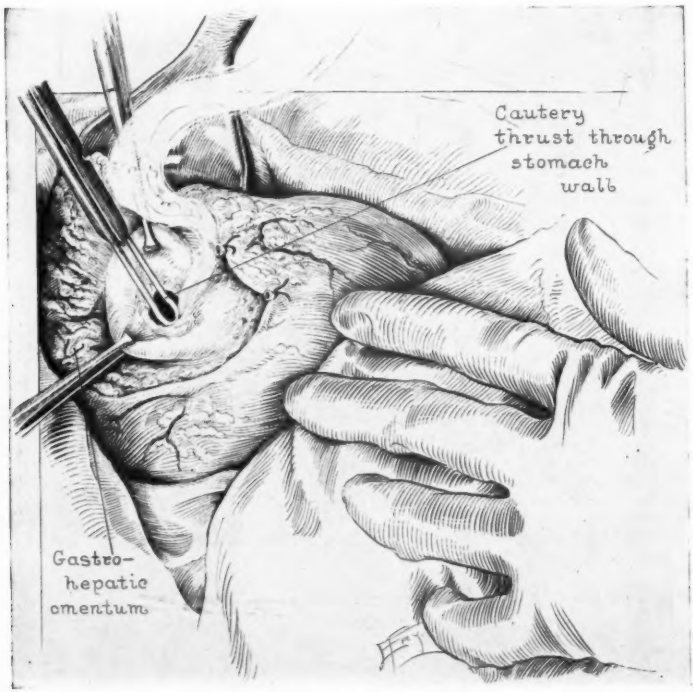

Fig. 478.—The region of the ulcer is elevated and the wall of the stomach at the site of the ulcer is burned through. (Donald C. Balfour in Surgical Clinics of North America, October, 1921.)

Of the 13 cases that recovered, 3 (Cases 5, 14, 20) were reoperated and gastro-enterostomy performed. We have had occasion to reoperate cases of our own as well those operated in the acute stage by others, and have often been surprised to find little pathology. The old dictum that a perforation heals an ulcer has in many instances in our experience been found correct.

We have found no scarring, no adhesions, no tumefaction, and were it not for the fact that we personally had seen the perforation we would be inclined to say that none had existed.

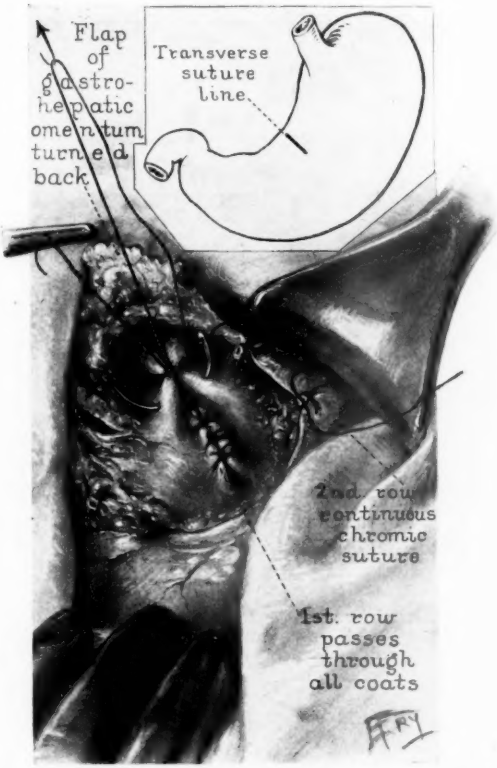
Flap of gastro-hepatic omentum turned back
Transverse suture line
2nd. row continuous chromic suture
1st. row passes through all coats

Fig. 479.—The cauterized area is closed by a row of interrupted sutures and the suture line covered by a continuous suture. (Donald C. Balfour in Surgical Clinics of North America, October, 1921.)

This may be the rule, but the exceptions presented themselves in Case 5, which was reoperated in one year, and a large mass and adhesions were found. In Case 20 patient was reoperated in six months, with the same findings. Case 14 had all clinical manifestations of ulcer, and gastro-enterostomy was performed

in spite of the fact that no gross pathology was visible three years after perforation. In our newly instituted follow-up clinic at our hospital we are attempting to *x*-ray, examine, and prescribe proper medical treatment for these recovered and reoperated cases of perforated ulcer.

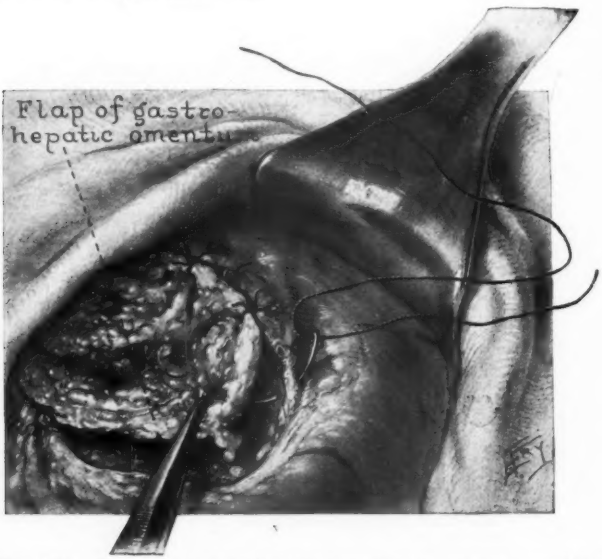

Fig. 480.—The flap of gastrohepatic omentum is sutured over the first suture line by interrupted stitches. (Donald C. Balfour in Surgical Clinics of North America, October, 1921.)

MULTIPLE CHONDROMATA OF HAND

THE patient, M. N., female, age eleven, was admitted to the hospital with the following history: For the past three years

Fig. 481.—Chondroma of hand.

has observed a small swelling on the radial surface of the left middle and index-fingers. The masses have grown larger, but have given no pain and have not interfered with joint motion.

Examination shows definite masses the size of beans on the dorsoradial surfaces of the middle and index-fingers. Masses are solid in consistency and give no pain on pressure.

x-Ray examination shows definite masses at the above-mentioned sites in addition to masses on the ulnar border of the metacarpal of the index and on the radial border of the metacarpal of the middle finger.

Operation.—Gas-oxygen anesthesia. Incision, isolation of mass. Growth in middle finger size of bean, outer shell of which

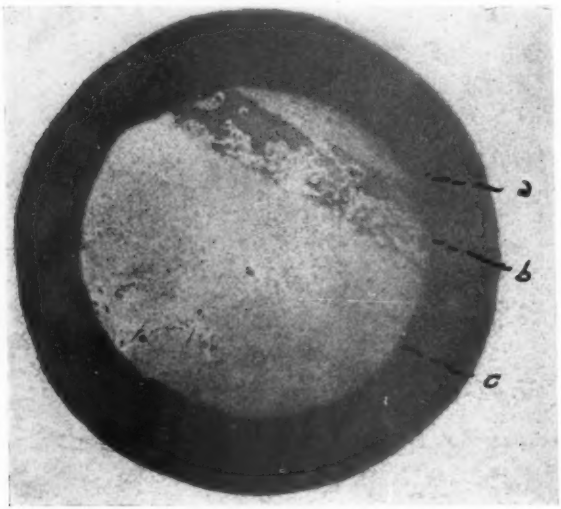

Fig. 482.—Chondroma showing: *a*, Periosteum; *b*, atrophic bone; *c*, cartilaginous tumor arising from endosteum.

is very thin. On penetration a thick gelatinous fluid is evacuated. Wall of mass curetted, swabbed with carbolic and alcohol, and tissues sutured without drainage.

Pathologic Report (Dr. Yaguda).—The specimen consists of some small bits of curetted tissue which are gristly in appearance and look like young cartilage. The tissue is pale and non-vascular.

Microscopic examination shows cartilage having a hyaline intercellular structure. Toward the periphery a thin layer of atrophic bone covered with periosteum can be seen. The tumor appears to arise from the endosteum.

Diagnosis.—Multiple chondroma.

DEGENERATIVE FIBROMA COMPLICATING PREGNANCY

DR. WILLIAM GOLDSTEIN

THE patient we are about to operate is a female, age thirty-four, housewife, who was admitted to the hospital November 19, 1924, complaining of pain in the left lower quadrant, amenorrhea of several months' duration, nausea, and vomiting.

Family History.—Mother living and well. Father died at forty-five from "lung trouble," three brothers and three sisters living and well. No history of carcinoma or tuberculosis in family.

Previous History.—Married five and a half years. Nullipara. Menstruation began at fourteen, regular every twenty-eight days, flow lasting three to five days. No pain or intermenstrual bleeding.

Present Illness.—Last menstruation July 12, 1924. She was examined on September 15th, and at that time her uterus was slightly enlarged and regular in outline. Breasts were painful, enlarged, and showed the presence of Montgomery's tubercles. Pregnancy was suspected and a re-examination was requested in two weeks. At that time vaginal examination revealed a definitely pregnant uterus with a small tender mass on the left side of the fundus. The urine showed a trace of sugar. Two weeks later the tumor appeared about four times its original size. The pain in the left lower quadrant was more constant and the vomiting more persistent. Her urine still showed sugar. The temperature and blood-pressure remained normal. Repeated examinations were made, and on November 15th the tumor reached the size of a large tangerene. Her pain was persistent and knife-like in character, more pronounced on the slightest exertion, and at times unbearable. Her temperature was 100.2° F. She was advised to enter the hospital.

Physical Examination.—Heart and lungs normal. Bimanual examination showed a large boggy uterus, the fundus reaching

a point midway between the symphysis and the umbilicus. Springing from the left side of the uterine fundus a hard, movable, tender mass could be palpated which was easily outlined and movable. There were no fetal heart sounds heard. Urine showed 0.38 per cent. glucose, otherwise negative. Total white count was 14,600 with 68 per cent. polys. Erythrocytes 4,090,000. Hemoglobin 68 per cent. Blood chemistry, normal.

This patient comes to us to seek relief from pain that has been persistent during the last three months. This pain cannot be explained by her pregnancy. The uterus is in normal position and there is no history or evidence of the existence of any adnexal disease. We find that this tumor mass which is easily outlined continued to grow very rapidly during this time. The only possible explanation for pain is the existence of this growth, which in our opinion is probably a pedunculated fibroid with either a partial or completely twisted pedicle.

Operation is indicated in this case for the relief of her pain; the likelihood of miscarriage due to uterine contractions; the probability of a difficult labor due to the possibility of an impaction of this rapidly growing tumor in the pelvic cavity during the process of delivery, and necrosis of the tumor due to the twisted pedicle. Pain is the most important factor. We know that many women have fibroids complicating pregnancy and go on to term with little or no trouble. Ordinarily this particular type of case is left alone, as the mere presence of a fibroid affords no excuse for resorting to heroic surgery and no ground for great apprehension. The pain was knife-like, began about the sixth week, increased in severity, was constant, more pronounced on the slightest exertion, moving in bed, and going up and down stairs. Many authorities regard this one symptom as sufficient grounds for operation. The rapidity of growth was astounding. Fibroids, as a rule, do grow rapidly during pregnancy and cause pressure symptoms, miscarriage, difficult labor. They sometimes become impacted and often undergo necrosis due to pressure of the fetal head or twisted pedicles. Then too, involution is slower and the puerperium delayed. If she is permitted to go into labor, the dangers of weak uterine muscle,

causing weak and ineffectual contractions, would result in delayed labor. After delivery, retention of the placenta, hemorrhage, or both, might occur; the latter is often of a serious nature and often proves fatal.

Operation.—We will make a low midline incision and carefully wall off the peritoneal cavity with moist napkins. We now find a pedunculated fibroid tumor springing from the left side of the uterus with a distinct twist of its pedicle. It is about the size of a large tangerene. The tumor is removed by clamping and ligating its pedicle. Care is being exercised not to injure the myometrium, thus avoiding the possibility of interrupting the pregnancy. The raw surfaces are peritonealized by a double line of suture and the abdomen closed in layers.

Postoperative recovery was uneventful. She was discharged on the fifteenth day postoperative.

Pathology: Specimen fibroid, gross examination, one irregular globular tumor 8 by 5 cm., firm and nodular and completely encapsulated. The capsule is thick, pale, and traversed by numerous dilated vessels. Cuts firm. Is pale except for islands of softer pink tissue. There is one small abscess cavity filled with thick yellow pus. Microscopic examination: Uterine muscle tissue showing areas of suppuration and polymorphonuclear infiltration with destruction of muscle-fibers. Diagnosis: Myoma of uterus with foci of suppuration.

From this time on until the onset of her labor there was nothing of interest. She went into labor on April 7th. Progress was very slow, although her pains were strong. On account of the prolonged labor I applied forceps. The puerperium was normal. When I last examined her on August 17, 1926 I found the uterus in normal position, smooth, and no evidence of fibroids.

In the August issue of the American Journal of Surgery Dr. J. Schwartz, under his very interesting article, "The Importance of Pathology in the Practice of Surgery," cites a case of a female aged thirty-six who was delivered by cesarean section because of a dystocia due to a uterine fibroid, who died three days after operation. Clinically she presented signs of pneumonia which were

thought to be entirely responsible for her death; beginning pertonitis was also suspected. At autopsy a diffuse suppurative plastic peritonitis was found caused by a degenerated infected fibroid which had perforated. Crossen states that the association of fibromyomata with pregnancy is always a matter for serious consideration, although many patients get along without trouble. Lafour, in a series of 300 cases of fibroids complicating pregnancy in which delivery took place by way of the birth canal, found the maternal mortality 40 per cent. and the infant mortality 77 per cent. Suserott, in a series of 147 cases, found the maternal mortality 53 per cent. and the infant mortality 66 per cent. In 20 per cent. of these cases forceps were used, with the loss of 8 mothers and 13 children.

CLINIC OF DR. EDWARD W. SPRAGUE

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MANAGEMENT OF CLEFT-LIP AND PALATE CASES

FAILURE of union during early fetal development of the mesially extending maxillary plates with each other across the primitive buccal cavity, in conjunction with failure of these same plates to unite with the intermaxillary bone which has been growing downward from the frontonasal process, results in the various cleft deformities of the lip and palate.

Total failure of union results in the extensive double clefts in the lip and alveolar border and the widely separated, so-called, double cleft-palate. Again, the mouth and lips may be perfect except for a small notch in the vermilion border of the lip. Between these extremes all degrees of complete and incomplete single and double clefts occur, depending on the stage at which correct growth was arrested.

Children born with these harrowing deformities bring great sorrow into the home. Hence, surgical repair of these serious disfigurements attracted attention early and many operations have been devised for their correction. From the great mass of work done in this field certain principles have been established and parts of the older technic have been incorporated in the modern cleft operation. Today we have several fairly definite plans of restoration, varying, of course, with the degree of deformity and the individual judgment of the operator.

Operative Repair Aims to (1) Restore normal function, which means perfect facial expression in lip cases and perfect speech in palate cases. (2) Restore normal appearance.

To accomplish this the tissues must be brought into normal position and relation. All operations which make complicated

flaps, which bring together parts that are not normally so situated, may be successful surgical feats in a measure and look very well when done, but they run the risk of failure to secure good

Fig. 483.—Completed lip operation. Note thickness of lip, eversion of vermilion border, and accurate line of same.

Fig. 484.—Showing natural expression when smiling.

function, and as the child grows up, distressingly increasing deformity of the lip and nose develops, caused by the unnatural position of the tissues. We have all seen the beautiful results

in a recent double hare-lip operation where the lip has been closed across below the premaxillary portion, but in a few years this same patient presents the most unsightly lengthening of the lip, with a tight, receding, vermilion border and a distressing convexity at the sight of the philtrum, all of which gives a displeasing profile.

Age at Which to Operate.—Considerable discussion has gone on from time to time between the advocates of the early operation and those who believe that from two years on is the best period. No doubt the earlier the operation, if successful, the better for the patient; but failures are more common in young infants, often so serious as to make secondary closure very difficult, especially in palate cases. Again, the first operation in the absence of scar tissue gives the best chance for perfect closure and function. The best time for work, probably, is between the two extremes. Even when all conditions have seemed ideal, I have had every degree of failure, succeeding only after repeated attempts.

As a general working basis the following schedule is used:

1. Refrain from all operative procedures until the child is at least four weeks old. By this time the general vitality of the infant is ascertained and the feeding is established. Also the danger from hemorrhagic disease of the newborn is past.

2. If the general conditions are good, close the alveolar border during the period after the fourth and before the eighth week. This plastic bone work, when done early, brings about a great change, swinging the nose into line and narrowing the cleft.

3. At about three months or thereafter, if the child is thriving and in good condition, close the hare-lip if it is a single or incomplete double deformity. If there be a complete double hare-lip, do only as much as seems advisable at the time. Discussion later on will bring this point out more clearly.

4. At eighteen months, if conditions are favorable, begin the cleft-palate operations. This age is often objected to on the ground that it is too late and that bad speech habits are already formed. On the other hand, I have patients whose palates were closed between the eighteenth month and two-year period who

speak plainly, and also have seen a number of failures in operations performed between the twelfth and fourteenth month, during which period of a child's development the tissues seem to be too thin and friable to hold the sutures well. Therefore, I favor the eighteenth month as the earliest time, unless the cleft is confined to the soft palate.

During the hot summer months operations are avoided if possible. The infants are prone to feeding disturbances and intestinal troubles, all of which lower the resistance to operation hazards that are often severe.

Methods of Procedure.—1. *Anesthesia.*—Ether is always used, given by the drop method on open mask or small Allis inhaler. Infants do not seem to be as subject to shock as adults and they stand the ether remarkably well. In fact, we have never seen serious trouble from the anesthetic in any operation. No cases of so-called ether pneumonia have developed.

2. *Position at Operation.*—The exaggerated Rose position is used in all the operations. The head is over the end of the table resting on the operator's lap. A small pillow is placed under the neck. This position lessens the aspiration of blood and mucus and gives easy access to the field. The suction apparatus is used to keep the field clear.

3. *Closure of the Alveolar Border.*—This is done about the sixth week. Previous to this time a narrow strip of adhesive may be placed across the gap in the lip with enough tension to tend to narrow the separation. This is changed frequently. If the skin becomes irritated the plaster is dispensed with.

In single alveolar clefts a small drill hole is made through the bone of the process on each side of the clefts about $\frac{3}{8}$ inch from the ends and far enough above the edge of the gum to escape the tooth follicles and at the same time secure a firm hold for the heavy silver wire sutures which are now introduced through the drill holes by using the fingers, passing the wire from the lip side into the mouth, then turning it in the mouth and passing it through the other drill hole from inside out.

An attempt is now made to force the parts of the cleft alveolus together with the thumbs pressing on each side. If

this is successful, the wire ends are now twisted tightly, thus forcing and holding the freshly trimmed cleft ends of the alveolar arch together. The free ends of the wire twist are cut off 1 inch from the beginning of the twist and are turned up into the nostril so as not to catch on things. Often the bones cannot be forced together manually as described above. In that event one or two small drill holes are made through the bone just behind the canine tooth curve on the uncleft side. Pressure on the alveolar ends now causes a green-stick fracture at the point of the drill holes, which permits the cleft ends of the arch to be swung together. The wire is used to hold them as before. In double clefts, with free intermaxilla, in addition to drill holes on each distal side of the cleft, a central hole is drilled through the intermaxilla. Two wires are now used, one from each side passing through the hole in the intermaxilla. Then each wire is twisted as the intermaxilla is forced back into alignment with the alveolar margins of the cleft. If the intermaxilla is greatly displaced forward and upward, seeming to be on the tip of the nose and held there by an elongated vomer, a wedge-shaped submucous piece is removed from the vomer. This permits the intermaxilla to be forced in an inferior-posterior direction, back to the alveolar line. Considerable attention to detail is needed at this step, as too large a piece or not exactly the right shaped piece of the vomer to be removed would result in recession of the lip. Firm union is the rule. However, in very wide clefts complete approximation cannot be brought about at once. In these cases the wires are twisted as far as seems safe and left that way. The cleft gradually narrows, and if not completely together by the time the lip operation is done, we expect the constant pull of the closed lip to completely close the arch later on. The wire sutures are left in place several weeks. Usually they are removed just prior to the next operation. If placed too near the edges one side will cut out. If cutting is noticed, remove the wires at once.

The contention has been made that operative closure of the alveolus is unnecessary, as cases often close beautifully, though very slowly, after lip closure only. This is sometimes the case,

but the chief advantage of early mechanical closure is the rapidly narrowing effect on the whole cleft, which could not be brought about to the same degree in later months.

4. *Lip Operations.*—Every effort must be made to save the premaxilla and the small central portion of the lip which it carries. Whether this part of the lip contains muscle or not is a moot point. It is surely needed for appearance and function. Without this tissue a successful and satisfactory repair is very difficult and almost out of the question.

As before mentioned, all procedures are done with the idea of bringing the tissues into their normal relations.

Fig. 485.—Widely separated complete cleft-lip and palate.

In single hare-lip operations accurate measurements and location of the incisions as described by J. E. Thompson are made. The attachments of the lip to the alveolar process are widely separated from the cleft edges and around the nose, thereby mobilizing the flaps. The clamps devised by Ladd are now applied. With a sharp-pointed knife incisions as outlined by the clamps are made, cutting from the nose to the vermilion border, stopping accurately there. These nicely curved incisions have the concavity on the mesial side and increase the length of the lip when closed. Small artery clamps are placed on the free ends of the cut flaps, which are left attached at the vermilion

border only. Using the clamps as tractors, the flaps, hinged at the vermilion border, are pulled gently downward and at the same time the cut edges of the lip are forced together. This gives an idea as to the symmetry of the sides. Accurate construction of the nares and approximation of the vermilion border are the most important points at this time. A silk suture is placed at the nasal end and a horsehair suture exactly at the vermilion line of the cut surfaces. These are provisional in a sense. If the appearance is good, the clamps, which are still attached to the free ends of the flaps that are to be eventually

Fig. 486.—Showing Fig. 485 completed.

cut away, are now lifted upward away from the alveolar process everting the lip, in which two deep silk sutures are placed on the mucous membrane side. These sutures must surely grasp the muscle in their bite, or a thin poorly functioning lip will result. On the other hand, if the needle passes too close to the skin, it will cause an unsightly dimple. In some cases where the lip is very thin a buried stitch of fine catgut is helpful. The skin and the vermilion border are now closed with horsehair.

After this a simple wire cage, bent into shape from a large safety-pin, or other fairly stiff wire, is placed so as to bridge over the suture line. This cage is held in place by adhesive

plaster so arranged on the chin, cheeks, and forehead as to relieve all tension at the suture line, especially when the child cries. I have discarded the silkworm-gut, button, plaster, shot tension suture, as it occasionally cuts and leaves a scar.

Much depends on the after-care. An attentive, conscientious nurse will prevent many disasters. Nursing is not allowed, the child being fed with a spoon or dropper. The retention apparatus is removed about the eighth day and the sutures on the tenth. A number of workers in this field have abandoned all appliances for tension relief, trusting entirely to the sutures.

Fig. 487.—Severe double cleft-lip and palate with the premaxilla rotated anterosuperiorly on tip of nose.

In double hare-lip the problem is more difficult and revolves around the premaxillary portion of the lip. This must always be saved and, when possible, fitted into its proper place in the lip and its vermilion border used as such. Sometimes this part of the lip is so small and thin it cannot be used as a complete unit at once. In this case an effort is made to develop it by doing a two-step operation. Close the nares and upper half of the cleft on one side or both sides, leaving the lower halves of the clefts and the vermilion border for a later session. In this way normal tissue tension is put upon the premaxillary part of the lip. In response to this use there is increased growth and in a

few months it is often large enough to utilize for the final step. It is astonishing in some cases, especially where the premaxilla is

Fig. 488.—Showing growth behavior of the premaxillary portion of the lip after the alveolus has been placed into line and first half of the lip repair made. The final step will be done when the premaxilla has grown large enough so that its vermilion border can be used as part of the final vermilion border in its proper place.

Fig. 489.—Profile of Fig. 488 showing normal columella-philtrum angle and contour of nose.

rotated anterosuperiorly on the tip of the nose, how perfect a columella and philtrum develop following the closure of the alveolus and the first step of the lip operation. If, as we hope,

this central portion develops sufficiently, a simple closure of the notch on each side is completed later.

Fig. 490.—Double cleft-lip and palate. Showing how use has developed the premaxillary portion of the lip. This tissue was very thin and small at first operation.

Fig. 491.—Showing how the premaxillary portion becomes a useful, integral part of the lip. The palate is completely closed. The shadows are misleading.

However, at times the premaxilla remains too thin, small, and undeveloped as compared with the lateral parts. In that event after measurements by the Thompson method, incisions

which form flaps from the lateral edges of the cleft are made as outlined by the Ladd clamps. These flaps are hinged at the vermilion border as described in the technic for the single cleft operation and small clamps are applied to the free ends as before. The edges of the premaxilla are now cut away so that the remaining part forms a V. Its vermilion border is entirely sacrificed. The lateral portions of the lip are now brought over to the premaxillary edges and the vermilion borders of these parts are closed with sutures across and below the V made from the premaxilla. The naris on each side is accurately fashioned, sutures are placed as in the single cleft, and the tension apparatus applied. In all this work emphasis is placed on making the premaxilla an integral part of the lip, thereby assuring normal expression and profile.

5. *Palate Operations.*—Lateral incisions after the method of Von Langenbeck are made as close to the edge of the gum as is possible, being careful, by all means, to preserve the anterior palatine artery and, if possible, the posterior also, although in many of the cases I tear across the latter artery and still find the circulation to be sufficient. Working through these lateral incisions, mucoperiosteal flaps are completely separated from the palate bone except at the anterior end. It is very necessary that the aponeurosis at the junction of the hard and soft palate should be entirely freed, as emphasized by all the authors on the subject. The flaps are now slid toward each other as a trial closure of the cleft. If the required tension at this time seems too great for the suture line to hold, the posterior ends of the lateral incisions are extended backward a short distance into the soft palate. The index-finger is introduced into this posterior part of the lateral incision and the tissues stretched without tearing the muscles. Great care must be exercised, for muscles torn from their attachments might result in a stiff, poorly functioning soft palate. This little procedure, however, generally permits the two flaps to be brought together without undue tension. Even with perfect relaxation of the flaps, experience shows we cannot rely entirely upon the sutures of the palate edges to hold until union is firm, which averages

about ten days. To maintain this relaxation many procedures and appliances have been tried, such as lead palates, buttons, mattress-sutures, tapes around the flaps, silver ribbon and band supports, the transverse wire sutures as used recently in France, packing gauze into the lateral incisions, and many other methods. During twenty years' experience I have used most of these, with average results, but not to my entire satisfaction.

Recently I have developed a method of using a wire tension relief pin, so-called, which has been perfectly successful in 5 cases, partially successful in 3, and a failure in 1. This failure was probably due to the improper introduction of the pin.

The principle is the support given by a moderately heavy, shortened silver probe, which has been threaded through the hard and soft palate, one on each side of the cleft, running horizontally and parallel to the cleft edges from the extreme anterior end to and through the pharyngeal aspect of the palate. The probes are fastened together at each end by silk thread sufficiently tight to relieve tension at the suture line. At first a continuous silver wire was tried. This was quickly abandoned, as it could not be accurately introduced or threaded through the palate, and great difficulty was experienced in turning the wire in the mouth as well as passing it forward on the other side of the cleft in the proper tissue plane.

The ordinary silver probe serves the purpose very well, being quite stiff enough, very simple, always available, and controllable. The flat end of the probe is bent at an angle of 45 degrees to form a handle by means of which it can be controlled and directed in its introduction. Just distal to this bend a small eye is drilled in the probe. The distal end is cut off at the desired length and sharpened to a point. Just behind this point another eye is drilled. Through this distal eye a strong fine silk thread about 20 inches long is passed and drawn through until the ends are even. Several lengths of this pin should be on hand.

The flaps having been prepared and separated and proper relaxation secured, the pin is placed in position.

Method of Introduction.—Seize the handle of the splint with a small, strong clamp held in the right hand. Introduce

the point into but not through the right flap of the hard palate at the anterior end of the flap, as far forward as possible, about $\frac{1}{4}$ inch from the cleft edge. With the first finger of the left hand on the nasal side of the flap and the thumb on the mouth side, guide the pin, threading the palate on it and keeping the pin parallel with the cleft edges as the right hand pushes it backward into the plane in the midst of the palate tissues, being careful not to pierce through the mouth or nasal surface. The point should emerge from the soft palate in the pharynx. The silk thread which is in the eye of the pin passes along with the pin through the tissues, and by means of a sharp hook is fished up and drawn through the tissues so that it will be free in the pharynx. Place a small clamp on the free ends of this thread. Release the clamp from the handle, leaving the pin in the palate flap.

Proceed on the left side in the same fashion, only reversing the hands. We now have the two pins in proper place with threads through the distal eye of each, the ends of which are held in light clamps. Pass similar silk threads through the proximal eye of each splint and place light clamps on the ends for identification. Later on, when the posterior threads are tied together and the anterior threads likewise, proper tension relief and support of the suture line will be secured.

At this point pare the edges of the hard palate and split the edges of the soft palate to the uvula tips. This gives fresh wide surfaces for coaptation.

Sutures of silk are now placed to close the gap, beginning at the tips of the divided uvula. With the first stitch as a tractor the uvula is pulled forward in the direction of the upper incisors, which enables us to put two stitches on the pharyngeal side of the soft palate. This narrows the posterior nasal opening and gives the palate muscles a better chance to close off the nasal cavity, which is necessary for perfect speech. Alternating heavy mattress- and fine silk sutures are used to close the remainder of the palate, and one deep mattress-suture of heavy silk is placed in the midst of the soft palate so as to insure a broad coaptation of the muscles in this region.

Now pick up the threads which are attached to the distal end of the pin and tie the first part of a knot, drawing the pins toward each other until tension is removed from the suture line. Secure the position by completing the knot and cutting the ends short. Likewise by means of the proximal threads draw the

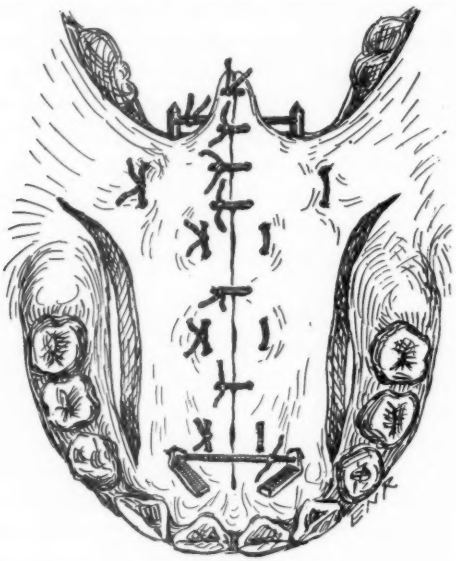

Fig. 492. Fig. 493.

Fig. 492.—The tension relief pin is cut from a 6-inch probe. It is made up in several lengths between 1 inch and 2½ inches. The point is blunt. One eye is drilled ⅛ inch from the distal end and the other just beyond the bend in the proximal end.

Fig. 493.—Shows tension relief pin in position. (Drawing made by Dr. E. N. Riggins.)

anterior ends together so as to relieve the strain on the forward part of the suture line and secure the knot when just enough relaxation has been brought about. This part of the procedure requires particular adjustment. Too much tension on the forward ends will cause the pins to cut out.

Convalescence is usually satisfactory unless there is severe infection. In that event, the wound separates in three or four days.

The pins are removed on the tenth day by cutting off the posterior thread and pulling the pins out at the point of introduction, taking great care not to put extra strain upon the delicate new suture line during this manipulation.

Careful daily inspection is made, as the pin may begin to cut out at the anterior end if it has been placed too near the mouth surface of the flap. In that event, the threads will have to be cut and the pull on the pin eased. The best results are secured when the pin is in the tissue of the palate in a plane two-thirds of the distance from the mouth aspect. It is also most important that the pin pass exactly parallel to the cut edge. Otherwise holes will come in the suture line from uneven tension.

In some cases the forward threads may be dispensed with entirely, tension relief being secured by using mattress-sutures which include the pin and pass entirely above the palate. These I have used when the arch at the anterior end of the palate was very high. The mattress-sutures tend to hold the pin up in its plane better than the threads through the proximal eye. Which method to use is determined at the time of operation.

In older children or those with large mouths it is not necessary to introduce the threads in the distal eye at the time the pin is placed. They can be passed easily through the eye with a fine needle after it is placed, thus avoiding dragging them through the palate plane.

The advantages of this tension relief pin are several: It is clean; not harmful even if a failure; does not interfere with the circulation or produce deformity or loss of tissue which would preclude secondary operations. The principle of the broad support throughout the entire palate length with not too great tension is approaching the ideal. The number of cases is admittedly small, and in one the cleft was not completely through the soft palate, so that sutures alone might have been successful. On the other hand, in 8 of the cases support was certainly needed.

In the very wide clefts a two-stage operation is advisable, closing whichever part of the palate that comes together with the least tension. This gradually narrows the remainder of the

opening, making complete closure easier later on. The tension relief pin has proved to be very satisfactory in these two-step operations.

The small troublesome opening at the extreme anterior end just behind the alveolar border which often remains after an otherwise successful closure, can usually be closed easily several weeks later by paring the edges of the hole and splitting the anterior end of the one side of the palate in the horizontal plane, including two-thirds of the thickness of the palate, and sliding it across the opening to the other side to which it is sutured.

Dorrance[1] has recently devised an operation for lengthening the soft palate in cases in which it is too short to to be expected to close the posterior nasopharyngeal opening during speech. I believe the same procedure to be excellent in the palates which have been closed by operation and after years of speech education remain too short and stiff to function. The operation offers great help in a condition which was sometimes hopeless.

Speech education will do much to perfect phonation. Contact with normal children in school stimulates the child to efforts at speech imitation. Much can be done before the school age by the mothers, in going over the alphabet and having the child carefully repeat the component sounds of the different letters.

While we should hope for complete success at the primary operation, we must take no step which would jeopardize the results of secondary operations.

Rapid progress has been made in the last decade toward proper evaluation of the various operations in cleft-palate and cleft-lip work. I believe we are fast approaching a settled technic in this very important field of plastic surgery.

Note.—Since writing this article I have encountered cases in which the tension relief pin could not be introduced with the finger and thumb as guides as described in the text. In such cases a straight aneurysm needle is helpful in elevating the flaps and guiding the pin.

[1] Annals of Surgery, August, 1925.

CONGENITAL OBSTRUCTION OF THE URETER RESULTING IN AN ENORMOUS HYDRO-URETER AND HYDRONEPHROSIS

ST. JAMES HOSPITAL, NEWARK, NEW JERSEY

THE patient was a healthy appearing boy of ten years with a normal history during childhood. He played with enthusiasm and seemed well in every way. His mother had noticed that his abdomen had been large and protuberant since birth, and as he grew up it also seemed to enlarge in the same proportions. There was no pain or distress at any time to cause her to be apprehensive. The condition was not suspected until Dr. Del Deo was consulted about a mild respiratory infection, and during his examination he discovered the tumor in the abdomen and referred him to St. James Hospital for operation.

Examination revealed a boy of average size and height for his age, with negative findings except for the abdomen, which was greatly enlarged in all directions. A cystic tumor seemed to occupy the whole cavity. The mass extended from the ribs, which were lifted up by it, down into the pelvis. The abdomen bulged forward and on each side. The anterior wall moved over the mass, but was so tense the tumor could not be definitely outlined, although it seemed to be larger and more symmetrical in the lower abdomen and irregular above. Each loin presented marked fulness, but the kidney could not be palpated on either side. Urine examination was normal. A working diagnosis of a large retroperitoneal cyst was made.

Operation and findings: Through a long left rectus incision exploration revealed a large retroperitoneal cyst, which proved to be a greatly distended ureter that was completely obstructed 2 inches above its entrance into the bladder. About the site

of the obstruction the ureter was buried in dense adhesions which bound it firmly at this point to the pelvis. The hydro-ureter at the lower end was globular and about the size of a distended stomach; it also was very tense and thin walled. Above this the hydro-ureter continued in an irregular sausage shape about the size of the small intestine, dilating in one section to the size of a distended colon. It extended to the kidney and was continuous with a large hydronephrosis of a greatly thinned out kidney. The posterior peritoneum was opened and dissection of the cyst was begun in an avascular plane. The ureter was cut across below the obstruction. A small probe was passed in its lumen into the bladder, proving it to be patulous below the stricture. The ureteral stump was ligated, cauterized, and dropped. Dissection was continued upward to the kidney. The kidney vessels were ligated and dissection finished. The complete system of dilated ureter and kidney was now removed intact with its fluid contents. The posterior peritoneum was closed and a stab drain of rubber-dam introduced into the retroperitoneal cavity. The anterior wall was closed in layers. Recovery was uneventful, the child leaving the hospital in good condition on the eighteenth day.

The pathologic report by Dr. John W. Gray follows: "There is an obstruction of the ureter at a point 22.5 cm. below the kidney. Just proximal to the obstruction the ureter is distended to form a large, thin-walled cyst the shape of a dilated stomach and measuring 7.5 cm. along its lesser curvature and 53 cm. along its greater curvature, with a circumference of 40 cm. at its widest point. There is a smaller cyst of the same shape and measuring 5 cm. along lesser curvature, 12.5 cm. along greater curvature, and 10 cm. in its greatest circumference 2.5 cm. above the larger cyst. Above this second cyst the ureter is distended and varies in diameter from 4 to 1.5 cm.

"The kidney pelvis is distended with urine and thin walled. The kidney measures 10.5 by 5 by 4 cm., is lobulated; and the kidney substance is greatly thinned out, the thickness of the medulla and cortex together measuring from 2 cm. to less than 1 mm.

"Microscopically the kidney shows lymphocytic infiltration, slight degenerative changes, and fibrous production. Glomeruli are present.

Fig. 494.—Kidney and ureter system with fluid contents: *A*, Kidney with hydronephrosis; *B*, artificial stricture due to ligature which was placed to prevent leakage where a small rent was made during the operation; *C*, lesser sac-like dilatation of hydro-ureter; *D*, greater sacculation.

"Diagnosis: Cyst of ureter, hydronephrosis, chronic nephritis."

Discussion.—The interesting feature of this case is that the enlargement of the abdomen had been noticed by his mother since birth and there had been no symptoms whatsoever. As long as infection does not take place and the other kidney is competent these cases seem to cause no disturbance for years. In the Cooper-Rose case, as cited by Bottomley, a woman aged twenty-eight had been treated thirteen years for an ovarian tumor which at autopsy proved to be a left pyonephrosis secondary to a wholly impermeable left ureter.

Whether these cases are congenital or not is open to question; no doubt many are congenital defects and others the result of intra-ureteral infection *in utero* or subsequently. In the true congenital occlusion there is an incomplete canalization of the ureter during development. This case may have been the result of an intra-ureteral infection, as the ureter was buried in adventitious tissue at the point of obstruction. On the other hand, it may have been congenital, there being no proof to the contrary, and it was probably present at birth. Some writers mention five years as the age limit to speak of congenital occlusions. This seems to me a difficult point to settle easily.

How to account for the great size in this case would be difficult except that the obstruction for a time had been intermittent, and, as Dr. Gray reports, there was a small amount of kidney left from which some secretion may have continued. The distention was greatest just above the obstruction which seems to be the rule in this condition.

It has been well established that practically no urine is absorbed from the dilated ureter. Probably the production of fluid goes on until pressures are equal. A uronephrosis probably means an intermittent obstruction, while the fluid is chiefly a transudate in a long-standing complete obstruction.

Ureteral obstruction produces either a primary atrophy of the kidney or a hydronephrosis, usually the latter. Following marked hydronephrosis a progressive pressure atrophy generally results.

John T. Bottomley[1] in a most interesting paper brought the

[1] Annals of Surgery, 1910.

subject up to that date with a report of 56 cases. His discussion of the matter is instructive and well worth reading.

Recently interesting contributions to our knowledge of this anomaly have been made by Bugbee, Eisendrath, Kretschmer, Young, and others.

Errors in diagnosis have been the rule in the past, but with present-day methods of urogenital investigation fewer of these cases will escape detection.

CLINIC OF DR. FRANCIS REYNOLDS HAUSSLING

NEWARK MEMORIAL HOSPITAL

PAINFUL SHOULDER

Case I. Acute Type with Calcareous Deposits.—H. R. F., white male, single, physician.

Admitted to Newark Memorial Hospital September 15, 1916.

Chief Complaint.—Severe pain about left shoulder.

Past History.—Presented nothing of interest with exception of several attacks of stiff neck, so-called growing pains, and repeated attacks of tonsillitis in childhood. Mild pain along course of sciatic nerve, occurring several years ago and lasting a short time only. No frank attacks of either rheumatism or gout. *x*-Ray of teeth negative. No history of injury.

Present Illness.—While on an auto trip began to have slight dull aching pain over left deltoid. This was made worse by any motion of arm, forearm, shoulder, or head. It rapidly increased in severity so that by night he was unable to sleep. The slightest motion caused excruciating pain, which radiated into the arm, forearm, hand, and fingers. This pain became almost unbearable by the time of his admission into the hospital on the following day. It was now impossible to get any relief from the pain either in the sitting or lying posture. Nor could it be controlled by hypodermics of morphin. There was at no time elevation in the temperature or pain elsewhere in the body.

Physical Examination.—Negative with the exception of several moderately tender points over the outer aspect of the head of humerus. Large doses of salicylate and colchicum had no effect on the pain. After a thorough therapeutic trial of several days' duration it was discontinued. Hot stupes, electric-light baths, the high-frequency current were each tried in

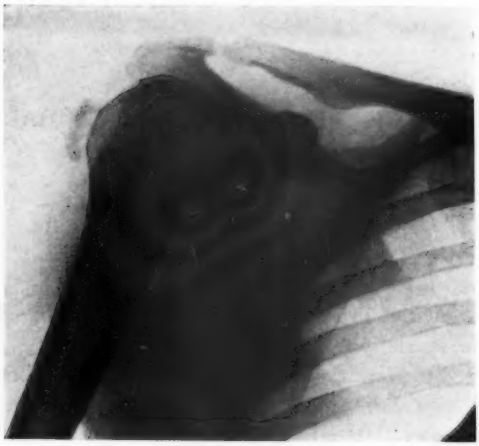

Fig. 495.—Case I. Acute type with calcareous deposits.

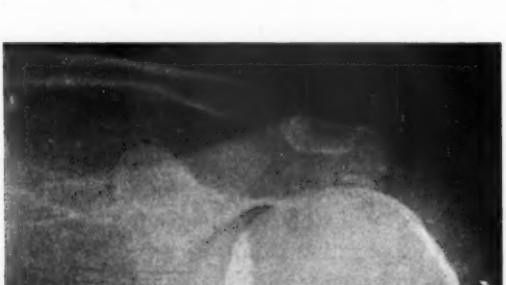

Fig. 496.—Case I. Nine months later deposits almost entirely absorbed.

turn. All seemed to aggravate the symptoms. Morphin had very little and very fleeting effect. Intense pain in the shoulder was constant. The radiating pains occurred in attacks and were unbearable. The roentgenogram showed an isolated shadow, situated over the head of the humerus in the region of the supraspinatus tendon. The intense pain having been present for ten days and having persisted in spite of all attempts to relieve it, we then for the first time used deep injections of quinin and urea hydrochlorid. The first injection was made into the muscle, during an attack of the radiating pain, at a point directly over the insertion of the supraspinatus tendon. Following the injection the pain radiated as far as this point of injection, where it was suddenly arrested. The relief was remarkable. Within twelve hours a second injection was made somewhat anterior to the first, and again into the tender spot as determined by palpation. The treatment was repeated every twenty-four hours until eight injections had been given, although the radiating pain did not recur after the second injection. All pain was relieved after third injection. Roentgenogram taken nine months later shows the shadow to have almost entirely disappeared. No recurrence of symptoms. A feeling of weakness in arm persisted for two weeks.

DIAGNOSIS

Jones and Lovett maintain that the diagnosis of subdeltoid bursitis is very frequently made on evidence which in many cases does not justify it. This is undoubtedly true, and to avoid confusion we have used the unscientific term "painful shoulder" for the condition presenting the following symptoms and physical findings with varying and not thoroughly understood pathology:

Painful shoulder with or without the history of injury and with symptoms acute, relapsing, or chronic in character, has, on insufficient evidence, in the past frequently been diagnosed as rheumatism, myalgia, neuritis, arthritis, peri-arthritis, sinovitis, neuralgia, strain, or sprain. The advent of the Roentgen ray has proved these diagnoses to be faulty in a considerable number

of cases. The roentgenogram may show one or more shadows about the head of the humerus, situated below the acromion process and extending occasionally as low as the greater tuberosity, or even on the inner aspect of the head of the humerus. Add to this the finding at operation of a bursitis with or without lime deposits in and about the tendon of the supraspinatus occurring in patients presenting the symptoms about to be enumerated, and we have a distinct clinical and pathologic entity.

ETIOLOGY

The etiology is still undetermined. Bruckner, Plummer, and Wrede believe this lesion always to be associated with some injury of the supraspinatus tendon, and that the lime deposits always occur in the tendons of these muscles. This condition may occur without the history of injury. A history of gout can at times be elicited. The microscopic examination in Montgomery's case showed numerous large giant-cells and resembled much Benechi's description of gouty foci. Montgomery reported a case following repeated attacks of tonsillitis. It is stated that this condition does not occur in the young.

Wolf believes that subacromial bursitis is an infection with the Streptococcus viridans, secondary to foci elsewhere in the body. Usually in the teeth as proved by culture. Less frequently in the tonsils.

Brickner says "The assumption of a bacterial or toxic origin for subacromial (or subdeltoid) bursitis has never been substantiated by any evidence."

ANATOMY

The subdeltoid bursa is situated over the external aspect of the greater tuberosity of the humerus and about 5 mm. from the cortex. Its posterior wall is in close proximity with the supraspinatus tendon and the humerus.

Codman points out that the subdeltoid and the subacromial bursa are one and the same thing. When the arm is abducted the entire bursa is subacromial; when it is adducted, a large portion of the bursa is subdeltoid.

Fig. 497.—Anatomy of subdeltoid bursa. (From Sabotta and McMurrich.)

PATHOLOGY

The deposits have been found to consist of calcium carbonate and phosphate.

It is of interest to note some of the conflicting views held by surgeons of prominence.

Kammerer found at operation in his case a semifluid whitish deposit lying in part between some fibers of the supraspinatus tendon beneath the inner wall of the bursa, but projecting into the lumen of the bursa.

Jones and Lovett state "that many cases described as subdeltoid bursitis are really periarthritis."

Whitman classifies periarthritis and subdeltoid bursitis together.

Hitzrot says, "To call the lesion a subdeltoid bursitis is a misnomer. The lesion lies in the tendon of the supraspinatus muscle beneath the posterior wall of the bursa or in the bone in those cases in which a fragment of bone has been torn loose. One has to go through the posterior wall to reach the real lesion."

Moschocovitz states "that all the cases that he has seen at operation have shown calcareous deposits in or about the tendon of the supraspinatus. Sections have been made and examined microscopically showing the calcareous deposit to be in the tendon."

Wrede and Bruckner say that the lime deposit always occurs in the supraspinatus tendon.

In Montgomery's case the calcareous deposits were confined to the upper wall of the bursa. The wall lying on the humerus and supraspinatus tendon was intact and the tendon appeared normal.

Darrach operated on 1 case in which the calcareous deposit was between the muscle and superficial layer of bursa. He thinks there are two distinct classes, one the acute bursitis and the other the tearing fractures of the greater tuberosity lifting up a projecting fragment of bone which is the cause of the irritation of the bursa.

Douglas at operation found a distended thickened subacromion bursa containing about ½ ounce of turbid fluid in which was floating a considerable amount of soft calcareous granular material. In the insertion of the supraspinatus tendon was the characteristic cheesy matter found in these cases. He thinks that the lesion is probably primary in the tendon and the bursitis secondary.

Moschcowitz likewise says "that the calcareous degeneration of the supraspinatus tendon is at the real bottom of the trouble and the bursa may be involved secondarily by its close proximity to the underlying tendon."

The lime deposits may disappear spontaneously in a few weeks or months. They may persist after a symptomatic cure.

According to Stern, "the literature of subdeltoid bursitis contains many references to the early and sudden appearance of calcium deposits in the walls of the bursa or in the supraspinatus tendon and to its equally sudden disappearance after the use of many forms of non-operative treatment—chiefly the various physiotherapeutic measures. The evidence that such deposits are lime rests upon the interpretation of the roentgenographic shadows. In 3 cases of subdeltoid bursitis in which shadows supposed to be calcium deposits were noted in the roentgenograms taken before operation, while such shadows were absent in the roentgenograms taken after the operation. In all 3 cases operation showed a small, oblong, encapsulated, soft but firm, non-fluctuating tumor, in or upon the supraspinatus tendon at its insertion in the greater tuberosity. The contents of the tumor was granular, non-crystalline, non-oily, non-fluid, brownish-gray in color, and absolutely not hard or bony when scraped with a knife blade. The laboratory reports in all 3 cases called the substance amorphous fat; it dissolved completely in ether and stained with osmic acid and Sudan III, while the chemical tests for calcium were all negative. The fact that such shadow-casting tumors are of a fatty nature readily explains the phenomena of their sudden appearance and disappearance."

No explanation is offered as to why a previously radiolucent substance takes on the property of radiopacity, but it is interesting to note that certain hematomas, especially those of the elbow and thigh, have been known to cast shadows comparable to bone shadows, though no calcium was present.

Case II.—Showing calcareous deposits on inner aspect of head of humerus is unique in our experience. Because of the varying locations in which surgeons had at operation found these deposits, we had for a long time felt that the cause or causes at work in the production of this lesion could lay down calcareous deposits elsewhere in the body. We had hoped to find a case in which the calcareous deposits were at a sufficient distance from the supraspinatus tendon and the subdeltoid bursa to prove this contention. This case seems to prove our con-

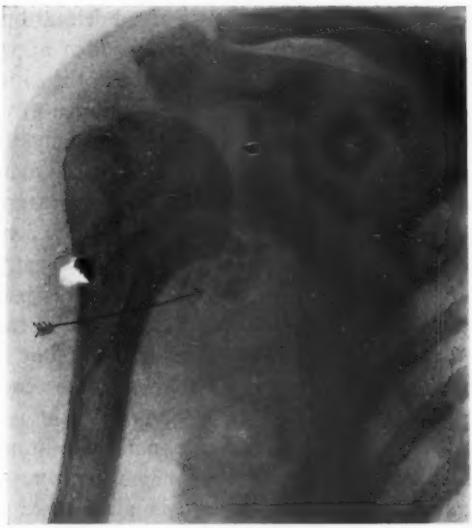

Fig. 498.—Case II. Unusual location of deposits.

tention beyond doubt. It was accompanied by the characteristic symptomatology of subdeltoid bursitis.

SYMPTOMATOLOGY

With or without traumatic history the patient is seized with more or less acute pain about the shoulder, ranging in severity from a mild dull ache to the most excruciating pain, lancinating in character, and radiating downward to the elbow, forearm, and fingers. In the severe cases the patient is totally incapacitated, unable to sleep, and confined to his bed. The slightest motion of the affected arm brings on the lancinating pains. The pain may be so intense that the general health is markedly affected. Large doses of morphin give no relief.

PHYSICAL EXAMINATION

On inspection nothing noteworthy with exception of occasional swelling unaccompanied by redness about affected shoulder in the more acute cases. On palpation there is usually moderate

tenderness over outer aspect of deltoid at varying distances below acromion process. The mildness of this symptom as compared with severity of the pain is very striking. In one of our cases all tenderness was situated over inner aspect of elbow and had persisted for one and a half years (Case V). All active motion about the shoulder is markedly restricted in the severe cases owing to the pain. Placing the hand behind the buttock

Fig. 499.—Case V (*a*). Unusual location of pain over external aspect of elbow-joint. Small indistinct shadow of calcareous deposit over the external aspect of the greater tuberosity of the humerus.

and abduction cause the greatest pain and are, therefore, most limited. Passive forward and backward motion of the arm through a small arc causes no pain and rules out joint involvement.

In some cases Dawbarn has shown that the tender point, which is the base of the bursa, disappears under the acromion when the arm is abducted. "Codman goes on to show that in attempting abduction about 10 degrees of motion can be ob-

tained without moving the scapula. Then the scapula is locked by spasm and moves with the humerus. This spasm may be temporary in mild cases. Sometimes pain prevents the patient from voluntarily raising the arm, though it may be raised by passive motion."

Codman points out that "the prognosis is very favorable if treatment is correct. The disability, even without treatment,

Fig. 500.—Case V (*b*). Unusual location of pain over the external aspect of the elbow-joint. *x*-Ray of the elbow-joint negative.

seldom lasts more than two years. He says that even severe or adherent cases, if there are no secondary contractures in the forearm muscles, will recover in from one to two years. In infective cases the prognosis is far worse than in traumatic cases. In chronic cases in which the arc of mobility is not affected the prognosis is fairly good."

Temperature and pulse are, as a rule, normal. Occasionally

all symptoms are absent, a calcareous deposit being discovered as a chance finding in the *x*-ray plate.

In the relapsing cases the attacks become more frequent over a period of months until finally they may approach the fulminating variety in severity. In the fulminating variety there may be swelling of the shoulder which is absent in the less severe variety.

As to differential diagnosis, brachial neuritides leave all motion at the shoulder-joint free. There may be paresthesia of the fingers and hyperesthetic areas may be found. In arthritis and periarthritis all motion is painful. In acute rheumatic fever we have multiple involvement of joints, rise in temperature, and local signs of inflammation.

TREATMENT

As yet the treatment of this distressing condition has not been standardized. This is well demonstrated by the divergence of opinion as expressed by various surgeons, ranging from pillow abduction support alone, on the one hand, to immediate radical operative interference on the other.

Operative treatment carries with it considerable technical difficulty, no certainty of cure, and an unsightly scar. Incision is made through the anterior fibers of the deltoid muscle. The sac is opened, contents removed, and, if practicable, its walls dissected from the neighboring tissues. Calcareous deposits should be removed through an incision at the base of the bursa. The arm should then be maintained in the abducted position or attached to the head of the bed which is raised on blocks. We have never found operation necessary even in obstinate cases if the conservative treatment is persisted in over a prolonged period of time.

In discussing the treatment of the condition it is again interesting to note the varying opinions. Kammerer reported "a case operated upon by him in which he mentions no other treatment having been instituted." Therefore we assume that he advocates operative treatment in all cases.

Montgomery extirpated the entire bursa.

Wrede and Bruckner say this is impossible and unnecessary.

J. B. Murphy reports a case injected with 2 per cent. formalin in glycerin. Arm at rest seventy-two hours. Patient left hospital in one week absolutely free from pain. Injection is followed by great pain for forty-eight hours. One injection cures as a rule. Diagnosis, subacromial bursitis. No *x*-ray taken. This is the only other injection treatment we have found mentioned and seems to have been very successful.

Hitzrot "operates in severe cases. In isolated cases, however, even after operation the same motions which caused the pain before operation will be painful, and an *x*-ray at this period will show no deposits in the tendon."

H. H. M. Lyle "emphasizes the point that the presence of a calcareous deposit does not necessarily indicate operation. Such calcareous deposits often disappear under conservative treatment." This is the crux of the situation as we see it.

Lilienthal, in discussing this condition, said "that for about thirteen years he himself suffered from all the symptoms of so-called subacromial bursitis of the left shoulder. Finally, when the trouble began in the right shoulder, and the disability became truly serious, he was treated by scientific massage, with the happy result of perfect restoration of function. Since then he has seen a number of these cases. He has operated on only one, and although the patient was temporarily relieved, there was a recurrence of symptoms later on. In another patient, however, in which there was great pain and disability, and in which, as in his own case, heat, medicines, and other remedies had failed, a cure was affected by massage. He has seen perhaps 6 of these cases, exclusive of the man upon whom he operated, and all relieved by massage. It appeared to him that operation should, indeed, be the dernier resort in the therapy of subacromial bursitis. In his own case no *x*-ray was made, so he was not sure whether or not there was lime deposit." He does not state whether or not *x*-rays were taken in the other cases. The diagnosis of calcareous deposit therefore is in doubt, at least, in his own case. To establish the diagnosis beyond doubt either an *x*-ray or operation are essential. Many cases

of pain and limitation of motion about the shoulder-joint show no lime deposits on *x*-ray examination, and unless the lesion is demonstrated at operation, the diagnosis must remain in doubt.

Dunlop advised operation in his case. This being declined by the patient, he then applied plaster for two days with the arm in abduction. The patient was anesthetized. Later hot-air baking was instituted, with perfect recovery.

P. G. Skillern, Jr., claims excellent results with blistering.

Darrach advises rest until the acute symptoms have subsided, and then proper massage and motion will cure a great many of them in from three to six months, but there are a great number in which the acute symptoms persist or recur in spite of everything. He reported a case in which the calcareous deposit was at least a centimeter in thickness. This man recovered in one year without treatment.

Douglas reported a case in which *x*-ray showed a large shadow under the left acromion. Pain had been present for two years. He had had local massage and medical treatment with little relief. For three years he had received vigorous antispecific treatment with injections of salvarsan and mercury. He was treated by the abduction method for six days without improvement, whereupon operation was performed, with perfect recovery.

Monks suggests "that the patient may sit by a table, the arm being abducted and placed upon a pillow on the table. This relaxes the short rotators and the deltoid, and keeps the base of the bursa from being in contact with the acromion."

Wolf says "in treatment too much emphasis cannot be placed upon the fact that heat in any form is contraindicated. The quickest and most lasting result seems to be obtained by the combination of gentle superficial massage, wet cold dressings, and large doses of salicylates. Massage is given once or twice daily until pain is relieved, but no motion is started until after two or three such treatments. After subsidence of pain the distant focus must be searched for, especially in teeth and tonsils. If some restriction of motion remains, baking or diathermia can hasten the cure. Seven cases are reported."

Deering believes that "subacromial bursitis is rarely surgical, and can always, even where surgery is necessary, be benefited by electrophysical therapeutic means. The condition is frequently traumatic, and may pass through all stages without germ infection. The first stage is that of congestion, with acute pain. The second stage is that of adhesion formation, with exudation, contraction, and muscle atrophy, and in untreated cases may last a year or two or indefinitely. In the third stage there is stretching of the adhesions. There is occasionally a deposit of lime salts from the exudate in the bursa. In the acute stage a rather long treatment with a high candle-power lamp, using moderate heat, followed by twenty to thirty minutes diathermy, using only a moderate milliamperage with a small electrode in front over the bursa and a large one behind the shoulder, gives immediate relief. Often four or five treatments carried out in three or four days effects a cure. Where there is effusion in the bursa the treatment best suited is the static wave current and sparks preceded by the high candle-power light. In the second stage the high candle-power lamp, fifteen to twenty minutes diathermy, and fifteen to twenty minutes static wave current will do much to avert the formation of adhesions and shorten the period of disability. In the third stage, when adhesions have formed, an efficient combination is the high candle-power light, diathermy, and the static wave current followed by static sparks used with a director and applied with the patient's arm on the stretch, to the bursal region in general and to the tender spots in particular. If there are calcareous spots they should be removed and the treatment described should then be applied." If surgery is effective it should be unnecessary to add this involved and cumbersome treatment. The presence or absence of deposits makes no difference in the efficiency of the treatment as suggested by us.

Jones and Lovett advocate that "the arm should be fixed in a position of abduction and slight external rotation because unless this is done adaptive muscular shortening and articular and pariarticular adhesions will cause stiffness in the abducted position of the arm. Radiant or other heat in the acute stage

of the affection is desirable, and massage in the subacute stage. Restoration of abduction is accomplished by repeated passive stretching when the acute stage is over. If this is ineffective and in long-standing cases, adhesions which are frequently present should be broken down at the outset by manipulation under anesthesia.

"In differentiating between pain caused by adhesion and that due to causes within the joint the following may be remembered: Traumatic adhesions usually form rapidly; they are not accompanied by any effusion into the joint, and pain on pressure is usually elicited and is referred to the site of injury. The limitation of movement is confined to certain directions and occurs only when the adhesions are stretched. If, on the other hand, arthritis is present, the symptoms follow injury after a varying interval, and the limitation of movement is in every direction and is at first due to protective spasm. The patient is unable to lie upon the joint at night. Both conditions may coexist."

From a careful consideration of these views it would seem that this condition has a marked tendency to spontaneous recovery, both as to the pathologic lesion and the symptomatology, therefore the rational treatment should consist in the least heroic method and least troublesome to the patient, which will most surely bridge the patient over the acute stage, by relieving the pain and restoring the affected shoulder and arm to usefulness. This permits nature to take her own time in removing the pathology. Because of the promptness with which our cases have been relieved by deep injections of quinin and urea hydrochlorid, often where other methods had failed, we offer this drug as an additional aid in treatment before resorting to the more radical operative procedure, which we have never found necessary. It has occurred to us that if this lesion always consists of a calcareous deposit in the tendon of the supraspinatus or at least of an effusion into the bursa, and appears there more often without traumatism as an etiologic factor, why should the tendons of other muscles and adjacent bursæ be immune under the same causative factors (whatever these factors may be)?

This view, it seems to us, is substantiated by Case II, which is unique in our experience. Severe backache and so-called sciatica, in which no underlying cause can be found, may be due to a similar deposit in tendons or bursæ. These conditions are also often promptly relieved by deep injections of quinin and urea hydrochlorid. The method of using the drug is as follows: At the point of greatest tenderness an injection of ℥xxx of a 4 per cent. solution of quinin and urea hydrochlorid is given into the muscle. A 2-inch 23 gage needle being plunged to the bone and then withdrawn $\frac{1}{4}$ to $\frac{1}{2}$ inch. This is repeated every twenty-four hours until the pain is markedly relieved. The injection is made slowly. It may be painless or it may cause a burning sensation as far distant as the fingers. One or 2 per cent. solutions are not efficient. The intervals are then lengthened. It is said that abscesses are prone to follow the injection of this particular drug. We have made many injections and have never seen an abscess form. Rigid asepsis, of course, is necessary. The drug must be injected into the muscle and not into the subcutaneous tissue. The treatment should always be preceded by a roentgenogram. The action of the drug is variable. We have seen one or two injections promptly relieve the pain (Case VII), while in other cases the first few injections markedly increased it. If persisted in, the treatment has always relieved the condition. We urge early active motion, but combine no other treatment with the injections.

Again, in some few cases the injection is followed by swelling which promptly subsides.

We claim no originality in the use of this drug to relieve pain. We advocate its use because we have frequently relieved this distressing condition where all of the many lauded methods of treatment have been used and have failed. We consider operation contraindicated.

Case II. Relapsing Type with Calcareous Deposit (Unusual Location).—M. L., female, age twenty-one, single, admitted to Newark Memorial Hospital December 7, 1921.

Chief Complaint.—Severe pain in right shoulder.

Past History.—Measles and whooping-cough in childhood. General health good. No history of gout, rheumatism, or localized pains of any description. Teeth and tonsils negative.

Present Illness.—Without history of trauma, slight pain in right shoulder region during past two years. Not severe enough to incapacitate patient.

On November 30, 1921 pain suddenly became so severe that she could not sleep. One deep injection at the time. December 7th, on admission to Newark Memorial Hospital, pain severe, tingling, and constant in character in right shoulder, radiating upward to right ear and downward into arm, forearm, and finger-tips. So severe that morphin gave only slight relief. Temperature 101° F., pulse 120, both subsiding on following day to 98.2° F. and 99 respectively.

Physical Examination.—On inspection, right forearm held flexed by left hand with right elbow close to chest wall. Shoulder moderately swollen; not red.

On palpation shoulder felt hot to the touch and was moderately tender. If done gently, elbow could be moved forward and backward through an arc of about 40 degrees without pain ruling out joint involvement. Abduction and placing hand behind buttocks impossible owing to the pain.

Treatment: In bed December 7th to 14th. Three deep injections of quinin and urea hydrochlorid while in hospital. Only other medication was one dose of aspirin and morphin sulphate, gr. $\frac{1}{4}$, nightly for four nights. Out of bed on December 14th. Slept well from then on without morphin until December 18th, when she was discharged, having no pain and being able to place hand above head.

December 21st reported that she sleeps well and is able to use arm without pain.

Very slight pain persisted at elbow, for which she had five injections into the region of the bursa at weekly intervals.

January 23d reported that she felt well, was gaining weight, and had no pain.

x-Ray shows numerous calcareous deposits on inner aspect

of head of humerus. This picture was lost. Subsequent *x*-ray, February 3, 1922, showed same deposits, but much fainter.

In my experience this location of the lime deposits is unique.

Her physician reports that one year after treatment her health is excellent and she has had no recurrence of the pain.

Case III. Acute Type Without Calcareous Deposits.—E. G. W., white male, age fifty-five, married, physician.

Chief Complaint.—Severe pain and a limitation of motion about right shoulder.

Past History.—Repeated attacks of tonsillitis, headache, abdominal pain, vomiting in childhood. Several attacks of renal colic; four attacks of appendicitis; symptoms referable to duodenal ulcer for seven years, and inguinal hernia. Appendicitis, ulcer, and hernia relieved by operation.

Four previous attacks of his present illness, the last one six months ago, and all affecting the left shoulder. Since last attack his general health has been unusually good.

Present Illness.—After a few days of discomfort about the right shoulder, made worse by lying down, suddenly at about noon on March 1, 1926, he was seized with excruciating pain in this region.

Physical Examination.—Fairly well-nourished adult. Apparently in great pain, clasping right wrist in left hand and fixing right elbow to chest wall in the endeavor to prevent the slightest motion. Moderate tenderness over external aspect of head of humerus. Moderate forward and backward motion of humerus not painful. Abduction impossible owing to muscle spasm and excruciating pain. No local signs of inflammation. No swelling about shoulder-joint. No elevation in temperature or pulse. No pain elsewhere in body. *x*-Ray negative.

In the patient's own words, "having had previous experience, the patient has lost no time in coming for treatment. Two injections given at 4 P. M. caused the pain to become somewhat more pronounced and to become unbearable by 9 P. M. It was impossible to get into a comfortable position and sleep was out of the question." Injections were persisted in.

Again quoting the patient, "Improvement after the first ten days was very rapid in comparison with previous attacks which had received other forms of treatment. I was able to run my own car within two weeks of the onset of the trouble and to do such things as play golf within one month. At no time was the injection followed by severe pain except the first. After that great relief followed within an hour or two of the injection and sometimes even earlier. A previous attack was treated by electricity and massage, followed immediately after the treatment by two weeks in bed in great agony."

In his previous attack decayed teeth were found and extracted. The extractions were followed by intense pain for a day or two and then by relief. In none of these extractions was the pus cultured.

To quote the patient again, "I feel that the injection treatment, while not as promptly soothing as massage and electricity, gives a more lasting relief from pain and apparently gives more prompt use of the shoulder."

Case IV. Relapsing Type Without Calcareous Deposit.—Mrs. C. M. H., age forty-five, physician's wife.

Chief Complaint.—Painful shoulder with almost absolute limitation of motion.

Present illness (as written by her husband) up to the time we saw her. Early in March, 1924, after lying on right shoulder for a prolonged period of unconsciousness, developed a severe pain in shoulder region running down outer surface of arm to fingers.

Being acutely ill with severe nervous breakdown, at first treatment was confined to gentle sedative measures, local lead and opium, analgesique, ichthyol, etc.

The middle of April, being somewhat better generally, and motion in arm being very restricted, gentle massage, heat, and gradual stretching was resorted to, with no relief, but rather an increase of disability and pain.

All motion was restricted, especially abduction and posterior rotation.

In May and June both moist and dry heat was tried, with local ichthyol and methyl salicylate and salicylates internally, using rest and at least once daily gentle stretching, only to increase the disability.

July continued same, till severity of pain caused a visit to the city for *x*-ray. Six positions, all clear, showed no deposits of lime or any bone or joint lesion (I had almost begun to fear a bone tumor).

Early in August, 1924 two injections of quinin and urea gave no relief, and she rebelled against more on account of marked local reaction.

Dr. ——— of Boston saw her about August 15th, after three weeks of daily treatment by high-frequency electricity had failed, and arm was no better.

Dr. ——— confirmed diagnosis of bursitis, and advised return to radiant heat and ichthyol, with gradual stretching each day, resting arm between times, but agreed with me that if after three weeks there was no relief, resort to Jones stretching might be needed.

September 15th, there being no improvement, gas was given and the arm was brought once gently but forcibly into full abduction, and the other positions then padded well and held in Valpeau.

Terrible pain ensued, which was not controlled by morphin $\frac{1}{4}$ gr., even though repeated in an hour.

After a week of most severe pain which morphin failed to control, except for perhaps two or three hours, the quinin and urea hydrochlorid injections were begun by us.

Present Illness (since we have had the case).—Patient in bed, mentally depressed and unable to lie comfortably in any position. Holds arm close to chest wall. Gentle forward and backward motion of arm through an arc of 20 degrees without pain. Abduction and placing hand behind buttock impossible owing to muscular spasm and pain. Pain so severe she is unable to sleep.

Report of Roentgen examination November 3, 1924:

"The examination reveals no evidence of any deposits in the

bursæ about the joint and is negative as to any infection as evidenced by absorption of cartilage, development of new bone," etc.

Treatment.—Morphin for pain, repeated deep injections of quinin and urea hydrochlorid, always at the site of greatest tenderness. September 13th, 15th, 18th, 21st, 24th, October 1st, 4th, 8th pain markedly relieved after second injection. October 14th no pain until arm was abducted 90 degrees. Full motion gradually returned without massage or any other form of treatment.

September 16, 1926: Patient reports she has entirely forgotten the arm. Has no pain and no limitation of motion. The husband, an orthopedic surgeon, is now, after two years of further trial, a firm convert to this method of treatment.

Fig. 501.—Case VI. Left shoulder. Calcareous deposit without symptoms.

Case VI. Relapsing Type With Calcareous Deposits (Bilateral).—H. S., age fifty-eight, married, clerk.

Painful shoulder, four years' duration, following the repeated

throwing of a club into hickory nut tree. Since then pain more or less severe, but never unbearable until present time.

Report of Roentgen Examination.—"On the right side there is a large deposit of calcium which overlies the shadow of the upper margin of the anatomic neck of the humerus, and there is a smaller shadow just at the outer margin of the greater tuberosity. These are evidently due to deposits in the bursæ about the joint.

Fig. 502.—Case VI. Right shoulder. Calcareous deposit with severe symptoms.

"On the left side there is only one minute shadow at the outer margin upper border of the greater tuberosity. This may be due to a deposit in the bursæ, as it does not have the appearance of a detached fragment of bone."

Case shows that this lesion may persist for four years, be bilateral, and have severe pain in one shoulder with absence of pain in other shoulder.

Case VII. Acute Type with Calcareous Deposit.—W. H. W., age thirty-two, single, carpenter.

Chief Complaint.—Painful right shoulder.

Past History.—Negative.

Present Illness.—One month ago struck on right shoulder. Painful shoulder appeared on the same night and persisted.

Fig. 503.—Case VII. Symptomatic cure in twenty-four hours after one month's duration of pain. Traumatism an etiologic factor.

Was able to work until three days ago, when pain suddenly became severe. Unable to sleep for past three nights. Pain radiates to elbow.

Physical Examination.—On inspection patient seems to be in severe pain. Supports right hand with left elbow flexed and pressed against chest wall.

On manipulation, moderately tender spot over region of bursa. Forward and backward passive movements of arm through an arc of 40 degrees not painful, ruling out the joint. Abduction and placing hand behind buttock impossible because of pain and muscle spasm.

Fig. 504.—Case VIII. Calcareous deposit under acromion process. Cured with injections.

Fig. 505 —Case IX. Painful shoulder. Roentgenogram January 12, 1924. Calcareous deposit. Cured with injections.

Treatment.—Advised to stay in hospital. Refused, but consented to one injection, which was followed in twenty minutes by marked relief of pain, with ability to abduct the arm through an arc of 90 degrees.

A second injection was given on the following day, with complete relief.

Report of Roentgen Examinations: They indicate a rather faint calcareous shadow lying underneath the acromion and

Fig. 506.—Case IX. Roentgenogram February 26, 1924. No calcareous deposit. Showing absorption in six weeks.

just above the upper margin of the greater tuberosity of the humerus. This may be due to a deposit in the subacromial bursa or to a traumatism which slightly detached the ligament and pulled up the periosteum. This is suggested by the fact that the shadow passes around the lateral margin of the greater tuberosity in one of the films, and the fact that the patient stated that he had an injury about one month ago.

His physician reports that one year after treatment patient is in perfect health and has had no further attacks.

CONCLUSIONS

1. Painful shoulder in a larger percentage of the cases is accompanied by a deposit of lime salts in the tendon of the supraspinatus or a bursitis, or a combination of the two.

2. The deposits of lime salts have a marked tendency to spontaneous disappearance, and with them the symptoms.

3. Lime salts may appear simultaneously in both shoulders, accompanied by acute symptoms on one side and as a chance finding on the other (Case VI).

4. The calcareous deposits may be found at a considerable distance from the bursa and the tendon of the supraspinatus (Case II).

5. There is a marked divergence of opinion as to the proper therapeutic procedure to be followed.

6. Since there is a marked tendency to spontaneous recovery, the treatment selected should be the one least heroic that most constantly relieves the acute symptoms.

7. The deep injection of quinin and urea hydrochlorid has been found effective in many of the so-called neuritides and myalgia. It has been most effective in our cases of so-called subdeltoid bursitis and, therefore, should be given further trial before resorting to operative interference in this class of case.

8. With mild or severe pain about the shoulder or pain radiating down the arm into forearm and hand, the diagnosis of rheumatism, arthritis, peri-arthritis, neuritis, or even bursitis is not permissible until lime deposits about the head of humerus have been excluded by means of the *x*-ray.

CLINIC OF DRS. HENRY BOYLAN ORTON AND HENRY BARKHORN

NEWARK EYE AND EAR INFIRMARY

BRONCHOSCOPIC CLINIC

Introduction.—Dr. Orton and Dr. Barkhorn in their clinic today wish to emphasize the importance of peroral endoscopic methods in the diagnosis and treatment of surgical and medical conditions of the respiratory and food passages, so we are merely recalling a group of special cases in which the extreme efficacy of these methods has been demonstrated, and will show the progress after such cases have been managed by the Jackson methods.

The value of the bronchoscope in the removal of foreign bodies is well established, but there seems to be a divided opinion as to its uses in diagnosing and recognizing certain diseases, especially in their early stages. If the patients are to derive any benefit from early diagnosis we must likewise use the bronchoscope and esophagoscope early.

We do not think it is mere hearsay to predict that not many years hence we will find that in hospitals in all patients over forty years of age, *x*-ray, fluoroscopic, and esophageal examination by means of an esophagoscope, if necessary, will be just as much a part of the routine as an ophthalmic examination in all head injuries, and the same condition will prevail in diseases of the chest to either substantiate or disprove the *x*-ray findings in obscure conditions of the chest.

To look and see is much better than to wait and see.

FOUR LARYNGEAL TUMORS

HENRY BARKHORN

This group of patients demonstrates the growths we most frequently see. Presenting them according to their ages we have:

Martin O'H., age nine, who has been under our care for papilloma of the larynx ever since 1922, at which time Dr. Orton did a low, local tracheotomy on him for difficulty in breathing, worse when lying down, preventing sleep, and causing much cough. We do only low tracheotomies because of the lack of deformity and the ease of removing the tube when the patient no longer needs it, and because we now do all our tracheotomies with a bronchoscope ready to be inserted through the mouth as an airway in an emergency, obviating the need of undue hurry and making the slightly greater technical difficulty of this procedure a matter of little importance.

As a matter of fact, Martin had been direct laryngoscoped and the diagnosis confirmed just before the tracheotomy.

In our experience papilloma is the most frequent cause of chronic hoarseness in children, since antitoxin and early tracheotomy have so tremendously decreased the post diphtheritic cases, and for practical purposes is the only laryngeal tumor of childhood that needs consideration.

Fortunately, it is a benign, self-limiting disease which will usually get well spontaneously if the parts be put at rest.

Unfortunately, it has a very definite tendency to repullulate, and is either easily transplanted or the mucous membranes of these particular patients have a weakness for some irritation, chemical or physical, and throw up epithelial overgrowths with ease.

Martin had papilloma from the epiglottis to the bifurcation of the trachea. They were so massive that we were in the habit of reaming them with a bronchoscope and removing the masses by suction. It would seem as though this method caused transplantation at the bronchial orifices, for in October, 1923, in spite of vast improvement in the larynx, the boy showed real difficulty in breathing even with the tube in place. Bronchos-

copy showed large masses as low as the bifurcation; these were removed; and even larger masses about the tracheotomy opening were removed, using the bronchoscope as an obturator against which to work from the outside.

Martin had at least fifty endolaryngeal and endobronchial treatments, survived an apex pneumonia which simulated a meningitis, had an abscess of the neck from a fissure in the tracheotomy opening, and, in spite of all this, has now been decannulated since 1925, and needs just a freshening of the edges and the insertion of a purse-string suture into the neck opening to make a useful potential citizen of him.

Harry R., age twenty-four, had had repeated tonsillitis for years and had been hoarse without relief, in spite of treatment, for the past six months when first seen in June, 1925.

Examination showed exceptionally bad tonsils and a very real pedunculated mass on the anterior third of the left vocal cord, fibromatous and not warty in appearance. As every doctor to whom he had been had told him all his trouble was due to his tonsils, and as none of them mentioned his vocal cords, Harry refused to have anything done unless his tonsils were also removed, so he was given ether on June 30, 1925, the tumor was removed, using a Jackson fibroma forceps, and just scalping the cord. Immediately thereafter the tonsils were removed and patient made an uneventful recovery with a perfect voice.

The pathologic report was a fibroma undergoing hypertrophy of the epithelium only at one point.

We do not approve of giving ether for this type of work, but there is no doubt that this was the only way to get permission to operate at all. Had we not managed as we did, someone would probably have taken out the tonsils without seeing the cord tumor, a procedure which we have known to occur. In addition, the relaxation of the tongue obtained by a good anesthesia surely increases the skill of the right hand in manipulating a tumor of the delicate laryngeal tissue by requiring a minimum of manual labor from the left hand.

The 2 remaining cases illustrate some phases of malignancy.

Paul W., age forty-five, was first seen June 14, 1926, com-

plaining of hoarseness for four months; had never had a previous attack. Examination showed an ulcerating warty growth involving the entire left ventricle. Our practice has been to omit removal of a specimen when the diagnosis is clinically certain, but we feel that practically as much harm comes from delay on cases that could have been diagnosed by biopsy, being thought benign, as by cutting into malignancy, provided you have consent for laryngectomy when you do so, and then complete the operation within a week.

The pathologic report was "the tissue from the larynx is invaded by carcinomatous cells of the squamous type showing numerous mitotic figures."

From 1919 to 1924 we had done a fair number of laryngectomies by the two-stage method of Crile. This method we felt made a technically easy operation out of a formidable procedure by protecting the mediastinum, the vagus, and the lungs. Since 1925 we have been following the technic of Dr. John E. MacKenty to the letter, with brilliant results, but we still feel that given a case in which some small factor might swing the balance, we would use the Crile technic and sacrifice the opportunity of getting rid of the permanent tracheotomy tube.

Dr. MacKenty has recently published a masterly monograph on this subject, to which we would simply add the operative warning that in dividing the thyrohyoid membrane the superior laryngeal artery, which has already been tied and cut, may be cut again, and, as the bleeding is hidden under the mouth pack, it may not be noticed and can be a cause of severe bleeding immediately after the operation.

Paul's pharynx was removed in one stage entirely under local, liberally infiltrated, on July 16th, in one hour and forty minutes. Fair union followed and in less than five weeks he was able to omit the esophageal tube. He has gained 20 pounds and already whispers words, but not sentences.

The last case, an extrinsic carcinoma, occurred in Mrs. Annie S., fifty-seven years of age, who was operated upon for a goiter in 1920, which, however, was apparently not malignant. About June, 1924 patient first noticed difficulty in breathing and

swallowing. She thought this a natural consequence of her goiter operation and did not consult a doctor until June, 1925, at which time she had a tremendous pediculated mass arising either from the posterior aspect of the larynx or the anterior wall of the esophagus. This mass acted as a ball valve, to cover first the esophagus and interfere with swallowing, and at other times the larynx, but luckily it hung backward most of the time.

This large plum size mass could be seen with a full curved tongue depressor. It bled freely on the least manipulation, and because of several melanotic masses in the old thyroid scar was thought to be a melanosarcoma.

On September 14, 1925 the entire mass was carefully removed with a tonsil snare and grasp, using a Jackson laryngoscope for exposure and illumination, but working externally to the instrument. A small end of the arytenoid came away with the specimen, but there was very little bleeding and no after-effects whatever.

The growth was found to come from the arytenoid alone. The interior of the larynx and upper end of the esophagus were carefully explored and found entirely negative. Section by the pathologist showed a papillomatous adenocarcinoma, possibly a metastasis from the thyroid, but probably arising from the mucous glands about the entrance to the larynx.

Intensive deep *x*-ray treatment was given, and today there is no sign of local recurrence, but the melanotic masses in the neck have grown much larger and there are definite masses of glands along the vessels of the neck on the right side.

Mrs. S. feels well, eats and sleeps well, and at present refuses further surgery, but we hope to persuade her to attempt a real cure.

In the discussion of these 4 cases we desire to emphasize that papilloma is not apt to become malignant in spite of repeated superficial removals. In other words, if a case is at first reported benign, another specimen malignant, it is most often because an inadequate piece was sent to the laboratory or because an insufficient number of sections were examined.

As a corollary, a negative report on a grossly suspicious tumor should not lead one to doubt the original clinical diagnosis.

We know that fibroma is the most frequent benign laryngeal tumor of adult life, that it is always far forward and hard to see, so we urge the operator not to accept the obviously diseased tonsils as a cause for laryngeal symptoms, but to investigate thoroughly despite a direct reference for tonsillectomy.

The malignant cases illustrate the vast difference between intrinsic and extrinsic growths.

Paul W., having a thin neck, was operated upon without ether, had a painstaking but not especially difficult operation, has gained weight, appears to be well, and will probably stay well. Mrs. S., on the other hand, had a growth outside the protecting bounds of the cartilaginous voice box at the very onset, and the prognosis is very bad. Extrinsic malignancies are of two types, those that were primarily intrinsic, but flowed over the margin, and those, like Mrs. S., which were always extrinsic and hard to handle. The first group have a fair chance if operated upon soon after getting through or beyond the cartilage.

BRONCHOSCOPY IN DISEASE

HENRY BOYLAN ORTON

Case I. Diagnostic Bronchoscopy: Carcinoma of the Bronchus.—The first patient we will present is that of C. B., male, age twenty-nine, white, married, a printer by trade; was referred to the clinic for hoarseness and a productive cough of two years' duration. His family history was negative; his past history was negative other than having had pneumonia twice.

Present History.—Has been coughing for two years. Sputum has been repeatedly examined for the tubercle bacillus, and on all occasions the examination proved negative. There were, however, a few streptococci and pneumococci present. No elastic tissue or fibrin, which shows there was no breaking down of lung tissue. Wassermann was negative.

Examination.—Anterior heart apex is in the fifth space, 8 cm. to the left, rate 80, no murmurs, occasional extrasystole. Posterior dulness, bronchovesicular breathing; bronchial whis-

per; increased resonance and fremitus and many crepitant and

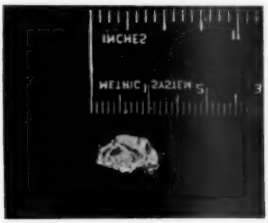

Fig. 507.—Case I. This picture shows the size of the growth which was revealed by means of the bronchoscope, and removed.

subcrepitant râles on cough. Has not complained of any pain; larynx is negative. His upper extremities show a slight clubbing

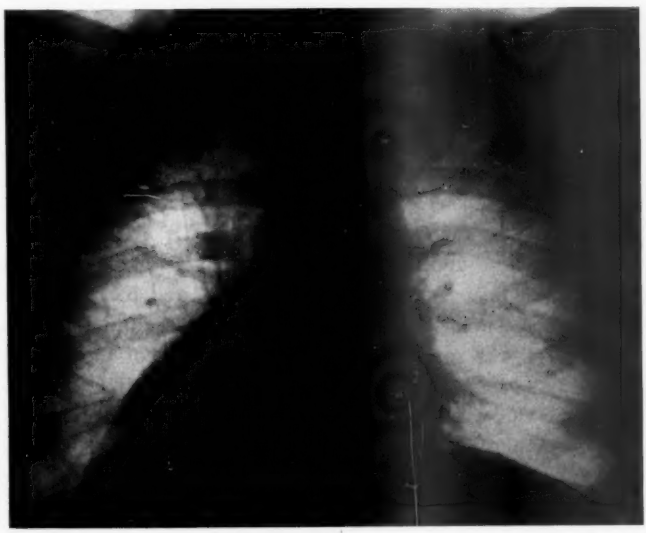

Fig. 508.—Case I. *x*-Ray picture taken four years after removal of the growth shows no evidence of a lesion involving the pulmonary field.

of fingers. *x*-Rays have been taken and reported back as an abscess at the base of the right lung.

Preceded by morphin and atropin one and a half hours before,

using as an anesthetic cocain to larynx, a diagnostic bronchoscopy was done, which revealed a fair amount of mucopus in the trachea and right bronchus. The carina was sharp and moving freely and at the point just below the middle lobe bronchus on the right side the right stem bronchus was partially blocked by a pedunculated, whitish-yellow growth, coming from the anterior wall of the bronchus. At the end of the growth a bluish-purple discoloration was seen, giving the appearance of a congested blood-vessel. The growth was removed and sent to the laboratory for examination. Following the removal of the growth a considerable amount of pus mixed with blood was aspirated from the lower bronchus.

The following is the laboratory report of the growth removed from the bronchus: Small, irregular mass of tissue 1.25 by 0.75 by 0.35 cm. One surface smoother than the other. No surface epithelium. Tissue consists of irregular islands and coils of small cells having large nuclei and very little protoplasm. They resemble the large round-cell type of sarcoma, but the supporting tissue is not so vascular. In places the protoplasm is present to such an extent that it resembles an epithelial cell. Certain areas show marked increase of chromatin. Diagnosis: Sarcoma(?).

Signed—F. A. Sutton, M. D., Pathologist.

Because of the uncertainty in the diagnosis (which naturally meant a great deal to the patient) we suggested to Dr. Sutton sending the specimen to Dr. Ewing, which was done. The following report was received: I think the tumor of bronchus is a carcinoma, originally of papillary type, but now growing so solidly that the papillæ are fused and in places the growth is quite diffuse like sarcoma. The tumor cells suggest an origin from transitional epithelium, such as lines the bronchi, so that they remain small. Squamous tendencies are absent, cohesion is slight, and the growth again tends toward the sarcomatous type. The growth seems to be fully malignant, but I have recently gathered courage from this type of lung tumor by seeing 2 cases in which *x*-ray, high voltage, caused a complete clearing up in the photo, and the patients seem to be well, for how long I do not dare to predict. Signed—James Ewing.

This man has had no further treatment since the removal of the growth, and after a period of four years he returned to the clinic today certainly a robust individual, weighing 185 pounds. He states he is perfectly well, has no pain or cough, no difficulty in breathing. He has no metastasis that we can find and the roentgenographic examination of his chest at this time shows no evidence of a lesion involving the pulmonary fields.

This case undoubtedly shows the value of the bronchoscope in an unaccounted for cough of long duration. It is evident that the tumor would not have been recognized and removed without it.

We have had in the clinic 3 cases of primary carcinoma of the bronchus, and McCrae in the Medical Clinic of North America, vol. 10, No. 1, July, 1926, gives a very interesting account of primary carcinoma of the bronchus.

Case II. Diagnostic Bronchoscopy. Vertebra of Rabbit Removed.—This man, B. K., age fifty-five, was referred to the clinic by Dr. Barkhorn. His family history was negative. The history of his present illness was most interesting. The patient had been employed in the acid room of a platinum refinery and one day was overcome with acid fumes. He was sent home and

Fig. 509.—Case II. Photograph of the vertebra of a rabbit removed at diagnostic bronchoscopy.

his physician called in, who said the man had a paralysis of his larynx due to the fumes. It is hardly possible that fumes could have caused a paralysis of his larynx; we do know ammonia fumes will cause an edema. He was at that time aphonic and continued this way for four years. Later a cough developed

which subsequently became productive and he was raising from 8 to 11 ounces of foul-smelling pus every day. He was then sent away by his physician to a different climate with the idea that a change of air would benefit his condition. About a month prior to the time he first saw Dr. Barkhorn he had severe pains throughout his chest and throat, with an increased amount of discharge, the pain being so intense that he was unable to lie down, and his physician instructed him to lean over the foot of

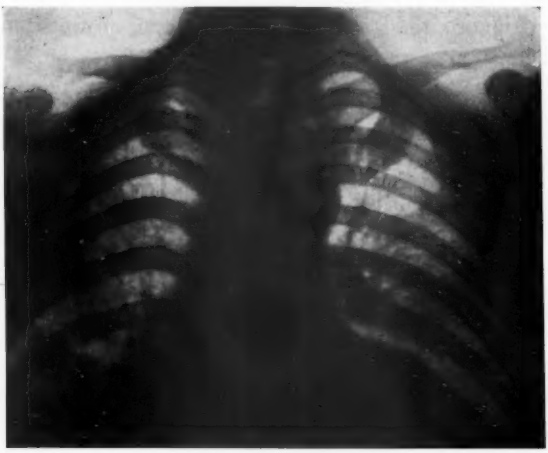

Fig. 510.—Case II. This picture shows on the right side what the roentgenologist described as a "calcified bronchial gland" which, in view of our findings, we now know was the foreign body.

the bed three times a day to drain the lungs, which was done, but afforded him little relief. At various times during that year a little blood was mixed with the sputum.

The physical signs were those of a lung suppuration; examination of the sputum did not reveal any tubercle bacillus; no elastic tissue or fibrin present. *x*-Ray picture was taken and the report of the roentgenologist was "a calcified bronchial gland on the right side near the hilus."

A diagnostic bronchoscopy was done on November 14, 1923 with no anesthetic other than cocain to the larynx, which re-

vealed the following: Carina sharp and moving freely in both directions. In the right bronchus just below the middle lobe bronchus a foreign body was seen. Applying side curved forceps the foreign body was grasped, brought up to the distal end of the bronchoscope, and then removed in contact with the tube. The foreign body was examined later and found to be a vertebra of some animal, probably a rabbit.

Remarks.—In this case a diagnostic bronchoscopy revealed a foreign body, the removal of which cleared up his condition. It emphasizes the value of a bronchoscopy in unaccounted cough and hemoptysis in the absence of tubercle bacilli. A most interesting phase of this case is the fact that we have been absolutely unable to obtain any knowledge of foreign body inhalation, and this man had been on a pension for two years, his condition supposedly caused by acid fumes. This foreign body would never have been removed or the chest condition cleared up without the use of the bronchoscope.

Case III. Bronchoscopy for Lung Abscess.—H. S., male, age twenty-four, was admitted to the hospital with a diagnosis of abscess of the right lung. He complained of a cough, fever, weakness, loss of weight and strength, and shortness of breath.

Family History.—Mother and father living and well. Wife living and well. No history of tuberculosis, cancer, nephritis, etc. No history of any lung disease in family.

History of Present Illness.—About three weeks ago had chill, developed bronchopneumonia. Went along usual course for about fifteen days. Temperature was normal for about thirty-six hours, then went up suddenly to 104° F.

Past History.—Usual childhood diseases. No history of any injury to chest. No operations on throat.

Present Illness.—Began three weeks ago, when patient had chills and fever. Patient went to New York despite fever, but when he returned home had to go to bed. Patient was told he had a pneumonia. No cough until the middle of last week. Dry at first, then became productive, with a large amount of sputum, especially in the morning. Sputum was bloody, orange

color. Cough not as bad now; worse when head is low. About middle of last week he developed pain in right side of chest.

Physical Examination.—Abdomen: Negative.

General: Patient lost a little weight since the onset of present illness.

Genito-urinary: Negative.

Cardiac: Negative.

Fig. 511.—Case III. Picture taken before bronchoscopy shows a large abscess on the right side.

Head: Pupils react to light.

Nose and ears: Negative.

Mouth: Sweetish odor to breath, tongue coated and dry; pharynx slightly injected.

Neck: Negative.

Chest: Expansion diminished on right side anteriorly, region of middle lobe of lung. Moist râles, metallic sound, impairment of percussion over same region.

Heart: Negative, no murmurs.

Extremities: Negative, no clubbing of fingers.

Patient is anemic and undernourished, shows evidence of acute illness.

Blood Examination.—Leukocytes, 13,900. Neurophils, 84 per cent. Lymphocytes, 12 per cent. Endothelial leukocytes, 4 per cent. Hemoglobin (Dare), 78 per cent. Erythrocytes, 3,860,000.

Abnormal red cells: Achromia, slight. Anisocytosis, none.

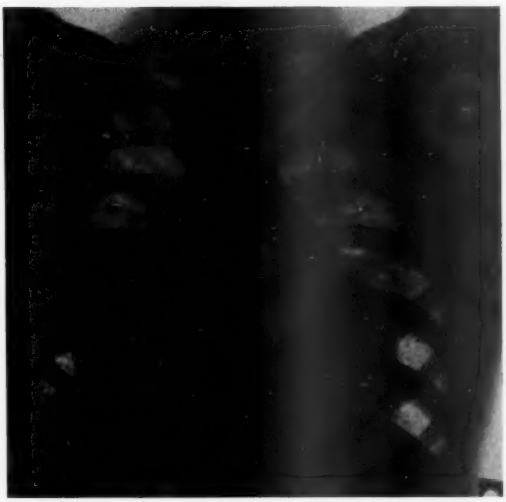

Fig. 512.—Case III. Picture taken immediately after aspiration of pus by means of the bronchoscope shows considerably more aëration on the right side.

Abnormal white cells: None.

Sputum Examination.—Numerous pus-cells. No tuberculosis cells found. Elastic tissue present.

Urine Examination.—Negative.

A bronchoscopy was done and a large amount of thick yellowish-green pus was found in the trachea and bronchi. The pus was traced to a posterior branch of the right stem bronchus and aspirated.

The patient felt very much better after this was done. A

week later a second bronchoscopy was performed, and a picture taken with the bronchoscope and aspirating tube in position. This shows the right side fairly well drained and the lung tissue shows much less pus infiltration.

Fig. 513.—Case III. The bronchoscope and aspirating tube in position; also shows a marked difference in the roentgenologic picture after a lapse of one week.

In this case there was certainly a decided clearing up of the chest condition in two bronchoscopies, and this shows of what help the bronchoscope can be in chest conditions by early aspirating of the secretions which could not otherwise be brought up.

Case IV. Diagnostic Bronchoscopy. Bilateral Peanut Kernel in Bronchi.—The infrequency of bilateral foreign bodies in the bronchi is probably of sufficient interest to speak of this one in which a peanut kernel was aspirated, one-half of which lodged and completely blocked the left bronchus, the other half lodging and partially blocking the right bronchus.

E. C., age five years, male, was admitted to the Essex County Isolation Hospital as a case of laryngeal diphtheria. The illness began three days before when the child, while playing with some other children and at the same time eating peanuts, apparently aspirated one during the excitement. The child had a choking spell, but the parents, not taking into consideration the aspiration of any foreign body, thought nothing of it until the evening of that day when their family physician was called

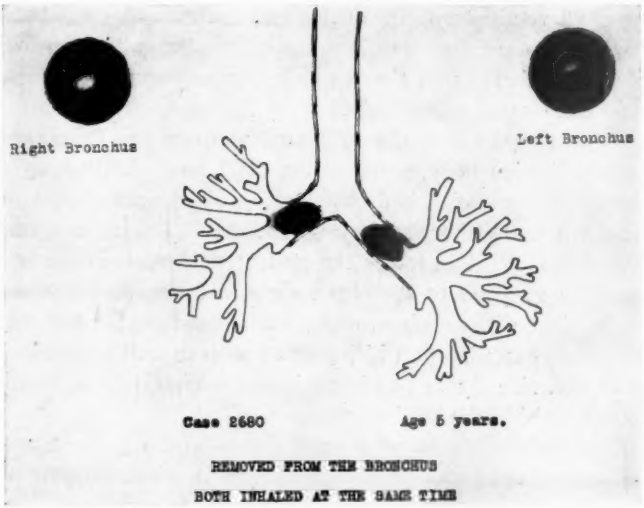

Fig. 514.—Case IV. Composite picture showing the peanut kernel in position, half of which completely blocked the left bronchus, the other half partially blocking the right.

in and 10,000 units of antitoxin was given. He diagnosed the case as one of laryngeal diphtheria.

Not improving, the family physician sent the child to the contagious hospital and a general examination upon admittance showed the child was a "well-nourished, well-developed child." Exceedingly short of breath, pulse very rapid, regular; heart not enlarged. Liver, spleen, and abdomen negative. Lower extremities negative. A culture was taken for diphtheria, which

was negative. There was marked suprasternal retraction, as well as intercostal and epigastric retraction. Voice good, left chest full of râles, with some dulness to percussion over the left side. The child became very cyanotic during the examination, with marked dilation of the alæ nasi, and it became necessary to intubate, using a four- to five-year tube. This was at 10.25 P. M.

The tube did not relive the cyanosis and was coughed up. He was immediately reintubated with the same size tube, after which there was a slight relief. A few minutes later, however, the child vomited up grape skins and contents of the stomach along with the tube. It did not seem necessary to reintubate. The impression at that time was a left lobar pneumonia, and the child was treated accordingly.

With a negative culture the next morning Dr. Pringle suggested a foreign body, and had the child *x*-rayed, although the history of the foreign body was not obtained until twenty-four hours after admittance to the hospital. At 10.30 A. M. on January 27th I was called in to see the patient, and upon examination found, in addition to the above signs, a diminished expansion on the right with an absence of breath sounds in the left chest. With the *x*-ray picture, which showed an increased transparency on the left side, I made a diagnosis of a foreign body at bifurcation just within the left bronchus.

The patient was bronchoscoped that afternoon, and we found half of a peanut kernel in the right bronchus, which was removed with peanut forceps without anesthesia.

Thinking of the possibility of a large foreign body being coughed from one bronchus to the other, it was quite possible that the sounds elicited in the left side would disappear. The child breathed normally and rested comfortably after the bronchoscopy.

Two days later we were informed that the child had a pneumonia; that there was flatness below the left clavicle with diminished breathing over this area and slight bronchovesicular breathing in the left axilla. Vocal fremitus diminished with a temperature of $103\frac{3}{5}°$ F. and no expectoration.

The patient was again *x*-rayed, which showed a drowned

lung appearance on the left side. As we were of the opinion that there might be a foreign body in the left side as well, we suggested another bronchoscopy, which was done that afternoon, and the other half of the peanut kernel was removed from the left bronchus without any anesthesia.

In this case all cultures taken for diphtheria were returned negative, as well as smears for Vincent's angina. The temperature chart showed a drop in the temperature after the second bronchoscopy. The picture in this case was one of pneumonia, and had it gone on a little longer it would have been that of an empyema due to the complete blocking off of the bronchus.

The *x*-ray showed the increased transparency of the left side with the heart pushed over somewhat to the right. Another picture showed the heart shadow obliterated due to the drowned lung condition, diagnosed as pneumonia.

The interesting feature of this case was that in all of the foreign body cases that we have seen we had not noticed the marked retraction that this child had when only one bronchus was obstructed, and this probably should have led us to believe that there was either a bilateral foreign body or large tracheal one.

The urinalysis was negative.

Blood examination.	1/28/24.	1/30/24.
Leukocytes (6, 7, 12,000)	14,800	14,400
Polynuclears	41 per cent.	68 per cent.
Lymphocytes	58 per cent.	32 per cent.
Endothelial leukocytes	0	0
Eosinophils	1 per cent.	0
Basophils	0	0
Hemoglobin: Instrument	90 per cent.	
Erythrocytes	4,350,000	
Color index	1.04	

In a personal communication from Dr. Jackson as to the frequency of this condition, Dr. Jackson stated that they have had 3 cases in which the peanut kernel was bilateral. It is because of the uniqueness of this case that we are presenting it.

As noted in the history, this patient was sent to the Isolation Hospital as a case of laryngeal diphtheria. This also brings out

the value of the bronchoscope in disease, namely, that of unaccounted dyspnea.

Case V. Bronchoscopy. Bean Completely Blocking Left Bronchus.—B. P., age seventeen months, male, was admitted

Fig. 515.—Case V. Showing the difference in size of a dry bean (small one) and the one removed.

Fig. 516.—Case V. Showing the beginning of an atelectasis on the left side before the bean had absorbed much moisture, then only partially blocking the bronchus.

to the Orange Memorial Hospital with history of foreign body. While playing on the floor the child put some beans in his mouth and choked; he became cyanotic and could not get his

breath for a few seconds. Mother slapped child on the back and two beans were expectorated. The mother continued to worry, so

Fig. 517.—Case V. Showing marked cloudiness, due to complete blocking of the left bronchus after the bean had absorbed moisture and swelled.

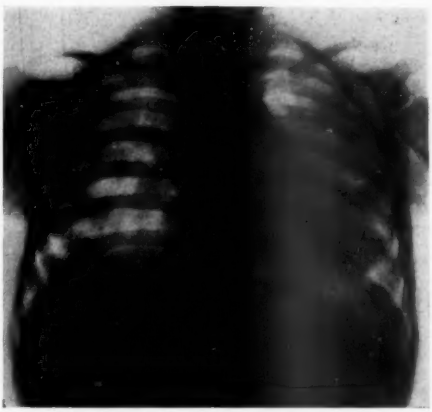

Fig. 518.—Case V. Showing the lung clearing up after the removal of the bean.

took the child to a doctor's office. The same night the child vomited. Upon admittance to the hospital the blood-count was:

Hemoglobin, 45; red blood-cells, 3,600,000; white, 11,600; pulse 64; urinalysis negative.

Physical Examination.—Child looks very sick with grunting respiration. Respiration labored. Left chest hyperresonant. Breath sounds do not come through posteriorly on left. Increased fremitus on left side.

x-Ray examination made of the chest in posterior-anterior position shows contour and structure of thoracic cavity and its contents distinctly. Right lung, normal visitation throughout. Heart not unusual. Left lung shows some increase in infiltration changes with definite evidence of pneumothorax involving lower axillary border and basal regions.

Due to the patient's condition, the physical signs elicited, and after the second *x*-ray picture had been taken, a left thoracic paracentesis was performed as the condition simulated empyema. It was quite natural that the paracentesis was negative, only a small amount of blood being obtained.

The patient was then brought to the clinic, where a bronchoscopy was done, and in the left bronchus, completely blocking it, was seen a bean. Due to the swelling of the foreign body the problem was to get forceps space for proper grasping of it. Peanut forceps were used and the time necessary for its removal was four minutes.

After the bronchoscopy an *x*-ray picture was taken and the massive lung collapse previously noted was markedly improved. There was normal ventilation seen throughout more than half of the lung field.

Case VI. Bronchoscopy. Pneumonography with Lipiodol.—The value of the injection of an opaque substance into the bronchus has been conclusively shown and demonstrated by Dr. Jackson and his co-workers, and by Drs. Lynah, Bellon, and others. This case is simply shown as a check-up on the roentgenologist. In all conditions of the chest the chest surgeon, internist, roentgenologist, and the bronchoscopist must work together. We will not burden you with the history of this case, which was one of bronchiectasis of ten to fifteen years' duration.

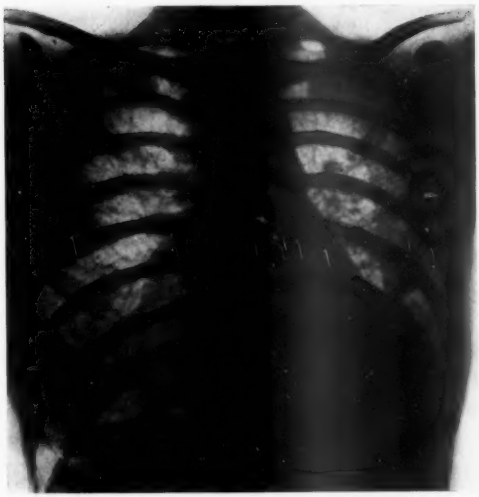

Fig. 519.—Case VI. This picture shows the condition of the chest before the injection of lipiodol.

Fig. 520.—Case VI. Taken after the first injection of lipiodol, showing a practically normal bronchus on the right side.

The roentgenologist reported a bronchiectasis on the right side of the chest. A bronchoscopy was done, and after removing a considerable amount of secretions from the right bronchus, 20 c.c. of lipiodol were injected and picture taken.

This picture showed the right bronchus outlined with lipiodol, giving an appearance of practically a normal bronchus. In comparing this picture with the first one and later consulting with the roentgenologist, it was suggested by him to try the left side. This was done, and the third picture shows conclusively

Fig. 521.—Case VI. Showing lipiodol in the bronchiectic cavities on the left side.

the lipiodol in the left bronchus and in the numerous bronchiectatic cavities and some lipiodol remaining in the right bronchus from the previous week. Also in the upper part of the left chest will be seen some scattered areas of lipiodol due to cough.

This shows the importance of pneumonography or lung mapping in chest cases, as the bronchiectasis was diagnosed on the right side, and after lung mapping it showed the condition was on the left side. Lipiodol is used not only for bronchiectasis,

but can be used in other obscure chest cases as well as subcarbonated bismuth powder insufflation.

ESOPHAGOSCOPY IN DISEASE

HENRY BOYLAN ORTON

Case VII. Esophagoscopy. Carcinoma of the Esophagus.—In this case we wish to bring out the importance of laryngoscopy and esophagoscopy in thyroid cases as a preliminary examination before operation.

Mrs. M. K., age forty-eight, was referred to the clinic complaining of difficulty in swallowing. Her family history was negative for tuberculosis and cancer. Her past history was negative. She had enjoyed good health up to one year previous to coming to the clinic, at which time she had difficulty in swallowing with an enlargement of the neck, due to goiter. Patient was very nervous, had headache, had lost weight and appetite.

She had one or two *x*-ray treatments, and it was then decided that the condition would entirely clear up after removal of the goiter. A thyroidectomy was then done.

This patient complained of the same symptoms after the operation as before, and *x*-rays taken showed a spasm at the beginning of the esophagus. She had some pain on the left side on swallowing, which radiated to left ear. Upon examination we found that there was mucus in both pyriform sinuses and the left cord was in a cadaveric position. Wassermann was negative.

A diagnostic esophagoscopy was done, and just in back of the cricoid cartilage, in the esophagus, was seen a granulating mass, bleeding freely on contact. A specimen was removed for examination which showed it to be "epidermoid carcinoma of the esophagus."

The symptoms here presented from the start a case of esophageal trouble, but, not looking further, the thyroid was removed. All cases of thyroid should certainly have an esophageal and laryngeal examination made before operation.

We had another case present itself very recently with very

much the same history, and in this case, upon diagnostic esophagoscopy, right in back of the cricoid cartilage was again found a bleeding area. This was not of sufficient size to remove a specimen for examination. It is very suspicious of a new growth and we will esophagoscope the patient again at a later date.

Case VIII. Esophagoscopy. Carcinoma of the Esophagus.—Early examination of the esophagus cannot be too strongly emphasized in the following case if we are to obtain or attempt to obtain any good results in carcinoma of the esophagus.

Fig. 522.—Case VIII. *x*-Ray showing a roughened and constricted portion of the esophagus, 1½ inches below point marked by arrow. Growth was found to be carcinoma.

J. B., age fifty-seven, male, married, was referred to the clinic by Dr. E. P. Schaffer, complaining of inability to swallow solid food. His family history was negative and his health had

been good until one month prior to that time, when he had hiccough. He ate food and then had a spasm; after the spasm relaxed he would be able to swallow rest of the meal. He gradually became worse and had lost slight amount of weight. The patient had no pain, but when starting to eat had a slight regurgitation, but no vomiting.

Fig. 523.—Case IX. This picture illustrates the danger of rupturing the esophagus when attempting to dilate a stricture of this kind without the aid of an esophagoscope.

An esophagoscopy was done and a marked spasm of the cricopharyngeus muscle was seen. At 33 cm. from the teeth on the anterior wall of the esophagus there was a mass protruding into the lumen, bleeding freely on contact. A specimen was removed for examination which proved it to be "squamous epithelioma."

The *x*-ray picture in this case showed a roughened and constricted portion of the esophagus not at the area indicated by

the arrow on the plate, but about 1½ inches below, where there was found a growth upon esophageal examination.

An attempt was made to apply radium, but because of stenosis this was unsuccessful. The patient was then referred to Dr. Dieffenbach for resection of the esophagus, and at the time of the operation we passed an esophagoscope to light up the area. The operation revealed the fact that the growth was too extensive for resection of the esophagus, although the first symptoms had appeared only two months prior to the time of operation.

Here was a patient with a history of trouble extending only over a very short period, yet at the time of operation the growth was too extensive to remove it. The need here is earlier routine examination of the esophagus.

Case IX. Esophagoscopy. Esophageal Dilatation.—In the case of Miss R. D., age eighteen, referred by Dr. Wendel for spasm of the hiatus esophagus, we are but showing the *x*-ray picture to illustrate the danger of perforating the esophagus when attempting to dilate strictures of this kind without the aid of an esophagoscope.

CLINIC OF DR. JOHN FRANCIS HAGERTY

ST. MICHAEL'S HOSPITAL, NEWARK, N. J.

OBSERVATION OF GOITER

GOITER is surely a more common and more serious ailment than it is ordinarily thought to be, as is proved by the increasingly larger number of patients seeking relief, and because, not infrequently, early treatment has not been intelligently applied. However, inquiries from physicians and patients in smaller cities, articles appearing in newspapers and medical journals, and addresses at society meetings, lay and medical, all prove that a greater interest is being taken in the disease, and that the profession and the public are becoming alive to its importance. We shall endeavor to help by recording such clinical observations as have seemed to us important, leaving to the physiologist and the laboratory workers discussion of its etiology and its relation to disturbances of other glands of the endocrine system.

Simple, parenchymatous goiter occurring in young girls from twelve to sixteen years of age ordinarily requires little if any treatment, and parents should be advised that within a few years the swelling will disappear. When it has persisted one or two years without change, or in districts where goiter is common, small doses of potassium or sodium iodid should be given until the goiter has disappeared. When the goiter is very large and prominent and has persisted several years, the iodids may be given over a long period, and gradually increased to a larger dose. Some of our cases have after a year or two taken large doses, in a few instances as much as 60 grains a day, and with apparent benefit, viz., disappearance of the tumor. This is the only treatment indicated in these cases, and the use of *x*-rays,

violet rays, ointments, massage, operations, and—the height of folly—chiropractic treatment mentioned only to be condemned.

Not infrequently patients with simple goiter have been sent to us by other physicians for operation, and occasionally we have been importuned by patients to remove the tumor because of its appearance, but have felt that operative interference is never justified in these cases. In a few cases of parenchymatous goiter in males, occurring as a rule later than in females, the iodids have given very satisfactory results.

It is often stated that the administration of iodin might convert these simple goiters into toxic ones, but this has not been our experience, and we feel that it is unlikely, especially if given in gradually increasing doses.

The treatment of colloid and cystic goiters will depend on the size of the swelling, the rapidity of growth, the pressure effects (dysphagia and dyspnea), or perhaps on the appearance, which in cystic goiters at times becomes very unsightly. It must not be forgotten, too, that colloid goiter may contain adenomatous areas with varying degrees of toxicity, or that cystic goiters may cause marked distortion of or pressure on the trachea with resultant dyspnea, and that smaller nodular colloids or cysts are apt in time to gravitate below the sternum and clavicle and become intrathoracic. The action of the sternocleidomastoid muscles during lateral movements of the head has seemed to us to propel these smaller growths toward the midline, and inspiration and sighing tends to aspirate them into the chest. Since the only satisfactory method of treatment (and which is usually safe) is removal, this should be advised. In these cases iodids (frequently given) and the other measures, mentioned above, are not to be considered, and *x*-ray treatment might do harm by destroying normal thyroid tissue with the possibility of inducing hypothyroidism. In large cystic goiters, not a few of which are partly substernal, anesthesia adds considerably to the gravity of the operation. These patients need the aid of their accessory muscles of respiration and local anesthesia should be used.

When palpating goiters, if, on asking the patient to swallow,

the fingers cannot be inserted below the lower border of the gland, it may be said to be substernal, and, if such patients or those having small nodular colloids or cysts be asked to take a deep breath it will be seen how far into the chest these tumors descend, at times out of sight. Whether all goiters become intrathoracic in this way or what proportion of them are congenitally so, we cannot say, but all such growths have serious possibilities and their removal should be advised. Intrathoracic goiters are very distressing and serious and often formidable to the surgeon. Marked flattening and distortion of the trachea is often seen in these cases. Prolonged pressure may induce softening of the tracheal rings, pressure on the recurrent laryngeal nerve may cause paralysis of the vocal cords and severe dyspnea, stridor, and cough. There is always a chronic laryngitis and tracheitis, and, at times, interference with the circulation and edema within the mediastinum. Severe coughing spells, retching, and sudden exertion may cause such increase of pressure within the mediastinum as to place these patients in imminent danger of sudden death. *x*-Ray examinations furnish valuable information as to the size of the tumor, its relations to the trachea, and, indeed, the possibility of its removal. Local anesthesia should be used. Extreme gentleness in operating, getting within the capsule of the gland, mobilizing the upper pole, finding the line of cleavage between the tumor and the trachea, and, after separation, gentle traction on the gland have been the factors which have helped us in these cases. The condition is one of great discomfort and the operation a very hazardous one, but there is no other method of relief, and we have had the good fortune to have successfully operated on several of these cases.

Goiter in the presence of other surgical ailments offers, at times, a serious problem for consideration. Ordinarily the disease causing the greater suffering or immediately endangering the patient's life should be given attention first. Colloid or cystic goiters or adenomata of mild toxicity need not deter us from the performance of other operations, but in the presence of toxic goiter, unless the accompanying condition be one of great

risk to life, thyroidectomy should be done first. Even in cases of mild toxicity where other operations are performed everything should be done to lessen the shock of operation and, if possible, general anesthesia should be avoided. We have seen several cases of severe toxicity developing after operation for other causes.

In this connection we have observed the rather frequent occurrence of goiter and uterine fibroma and adnexal disease. Whether there is any causative relation between the two we are not prepared to say. Probably not. Eight cases of this kind were seen during the past year.

Case I.—Unusually large bilateral cystic goiter, seen in a negress, was later operated for degenerating uterine fibroma and bilateral tubo-ovarian disease. She had not given any evidence of pelvic disease before the first operation.

Case II.—Severe toxic goiter, in whom during operation, from traction on the gland or possible injury to recurrent laryngeal nerve from artery clamp, there was cessation of respiration and apparent death. Removing all clamps, tracheotomy and artificial respiration revived the patient. Two months later, under spinal anesthesia, she was again operated for large multiple uterine fibromata and dermoid cyst of the right side. Two other cases of partial thyroidectomy for mild toxic goiter had subsequent hysterectomies and one, laparotomy for ovarian cystoma. All of these patients are now well. The frequency of the coincidence is sufficient to impress one with the necessity of inquiring into the possibility of concurrent pelvic disease.

When we consider the treatment of toxic goiter, and, for the sake of brevity, we shall include toxic adenoma and exophthalmic goiter in this class, we can hardly be as dogmatic as when dealing with other types, and yet the management of these cases is quite well understood. In the first place, we may be pardoned for saying that these cases should be placed in the hands of specialists. The average physician, seeing only an occasional case, and certainly the laity does not comprehend the seriousness of this disease, nor the fact that it cannot be treated as other diseases are.

First, let us say a word as to the cause. In our experience profound psychic impressions have invariably appeared to be the exciting cause of toxic change in the gland. Not puberty, nor heredity, nor child-bearing, nor previous illnesses, nor focal infections, but a history of grief, anxiety, worry, and severe mental strain can always be elicited on questioning these patients. Because of this and the resultant nervousness, loss of weight, tachycardia, thirst, sweats, etc., the treatment seems self-evident. Rest in bed, which *must be absolute* and away from all sources of worry, and an abundance of fluids and highly nourishing foods rich in carbohydrates, and the use of sedatives to combat the nervous instability common in these cases. In addition, iodin (Lugol's solution), as advised by Plummer, is given until these patients are brought into an operable condition, when the removal of more or less of the gland may be done. We have been impressed, as have others, with the fact that Lugol's solution is not so effective in toxic adenoma, which is usually seen in younger persons and is of slower development than true toxic goiter, and that its effects even in these latter cases are not constant. At times it fails to help or the limit of its usefulness is soon reached, and cannot be enhanced by increasing or varying the dose, but in the majority of cases the relief obtained is very marked and multiple stage operations, ligations, etc., are not necessary and the postoperative reactions are comparatively slight. The period of preoperative care is shortened, indeed, its full effects seem to be reached in eight to ten or twelve days. Why it helps up to a certain point and not beyond is not plain to us, and why it should help after the operation when more or less of the gland has been removed is not clearly understood. It is, however, the most effective remedy that has come into our hands in recent years, but must be used intelligently. It should be given only while under observation by those who can take advantage of its help in later surgical measures, and it must be emphasized that it will not *cure* toxic goiter.

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These points cannot be too strongly emphasized. The use of iodin will accomplish just so much. If advantage is not taken by removal of more or less of the gland its further use will be

found ineffective. For this reason patients who insist on being treated at home and getting medicine which will help, often lose the opportunity of being cured.

We would advise, too, against the use of iodin in quiescent cases or those of long standing, which are undergoing retrogression, the so-called burned-out cases.

Where Lugol's solution does not help we have obtained some benefit from sodium bromid with tincture of digitalis and small doses of tincture of opium given several days before operation. Digitalization and the opiates serve to tide the patients over the storm following operation. Luminal or other sedatives have not been effective.

When prolonged rest and Lugol's solution or sedatives fail to bring patients into an operable condition, as shown by absence of extreme nervousness, apprehension and irritability, and an average pulse rate of about 100 or basal metabolism readings under plus 30, we have found it wise to defer operation and advise the use of *x*-ray treatment, when, if the toxicity is lessened, operation may be undertaken.

Basal metabolism readings are a reliable index to the degree of toxicity, but they have to be done carefully, repeated frequently, and we have found that there is a constant relationship between the readings and the pulse rate. If the latter is recorded by the nurse or some person other than the attending surgeon, it will be found to be a reliable guide. We have never had an untoward result when the pulse rate had been around 100 a few days before operation.

When visiting the goiter clinics we have been impressed with the value of certain aids toward the successful issue of operations, viz., "stealing the patients," gas-oxygen anesthesia by a trained anesthetist, and a nursing staff trained to meet the emergencies following operation. However, these valuable helps can be had only in the larger clinics. During the last three years we have relied entirely on local anesthesia, and with almost complete satisfaction. Morphin hypodermically is given occasionally the evening before, and at times early on the morning of operation. It is always given one-half hour before operation, hypo-

dermically—$\frac{1}{4}$-grain dose with atropin. If the patient is not unduly excited and apprehensive, even though the pulse be very rapid, preparations are proceeded with. Vomiting or severe erythema or agitation we consider bad signs, and hesitate to operate. Novocain solution, $\frac{1}{2}$ per cent., is used freely by the infiltration method, and an interval of ten or twelve minutes allowed before starting the operation. After the collar incision is made, skin-flaps retracted, and bleeding points caught, the pulse rate and nervousness often lessens, and the operation carried on. If the patient is more agitated or the pulse rate has increased, the wound is closed and patient returned to bed. Having decided to continue, novocain is again injected freely under the muscles, and while waiting for absorption, all external bleeding points are ligated. The analgesia invariably from this point is complete.

Increasing experience has proved the wisdom of removing the major part of the gland in these cases, and the very slight reaction following almost complete removal has been gratifying. Extreme care is taken to secure complete hemostasis and patients are urged to cough or move the head about to test the security of the ligatures. Except for an occasional small cyst or adenoma rubber tissue drains are used. We have had two fatalities from secondary hemorrhage, where the operation was well borne, one occurring twelve hours later where partial relief followed opening of the wound and removal of clots, and the other occurred five hours later, where reopening the wound and tracheotomy promised relief, but the tube was coughed out and could not be reinserted in time. These are most unfortunate and it might seem inexcusable occurrences, and, knowing that bleeding occurs where the hemostasis seemed perfect, we have since drained every case. Subcuticular sutures and skin-clips have seemed to add to the appearance of the wound. The drain is removed, as a rule, on the second day and the skin-clips on the fourth day.

In spite of all precautions to determine the operability of each case, severe reactions will follow, which taxes our skill to the utmost and, unfortunately, at times defies our best efforts to

overcome. We have found Lugol's solution to be of service in some cases, though in others, when something was most needed, it has failed. Ice-packs, water by mouth or rectum, and morphin without atropin, as needed, are the agents we have relied upon. One is quickly convinced after dealing with these cases that toxic goiter is an unusual disease. Every case must be studied and dealt with on its merits. No standard treatment can be followed, and while removal of an organ so essential to life as is the thyroid gland does not seem scientific, the limitations of our knowledge and our experience seems to prove the correctness of the prevailing method of treatment.

CLINIC OF DR. E. ZEH HAWKES

PRESBYTERIAN HOSPITAL, NEWARK, N. J.

RUPTURE OF THE COLON WHILE TAKING AN ENEMA

MR. S., aged fifty-three, a man of average health, but with digestive disturbances, had learned by experience that enemas taken every few days gave him a sense of well being. These he had taken during the past year, two or three times each week, by the convenient method of turning on the hot and cold water faucets till the water flowed at the desired temperature and proper volume, then attaching one end of a rubber tube to the faucet and introducing the other end of the tube into his rectum. The amount of water used he judged by his sensations. The tube was not a rectal tube, but a piece of soft-rubber tubing.

On February 14, 1926, at 5.30 in the morning, he prepared his enema and introduced the tube into his rectum as usual. After a short time he judged by his sensations that the water was not flowing freely into his bowel, so, without removing the tube, he turned the faucets on fuller. Almost immediately he had severe abdominal pain. He pulled out the tube and went to bed. The pain he attributed to gas; it was so severe that he sent for Dr. A. L. Reich, who diagnosed rupture of the bowel. The writer saw him at 10 o'clock, concurred in the diagnosis, and sent him to the hospital for operation. He was taken to the operating room at 11.40, six hours after his accident. Temperature was 102° F., pulse 88, respiration 26. Abdomen was very rigid, tender, and distended, tenderness being most marked to the left of the midline. His condition seemed to be good.

Assisted by Dr. Reich, the abdomen was opened through the left rectus. There was an escape of free flocculent fluid having

The writer wishes to express his indebtedness to his friend, Dr. E. N. Riggins, for the illustrations.

a colon odor. Several deposits of fibrin were seen. The sigmoid was short. On a level with the brim of the pelvis, opposite its mesenteric attachment, the sigmoid had a slit-like perforation about 2 inches in length, surrounding which was a dark, hemor-

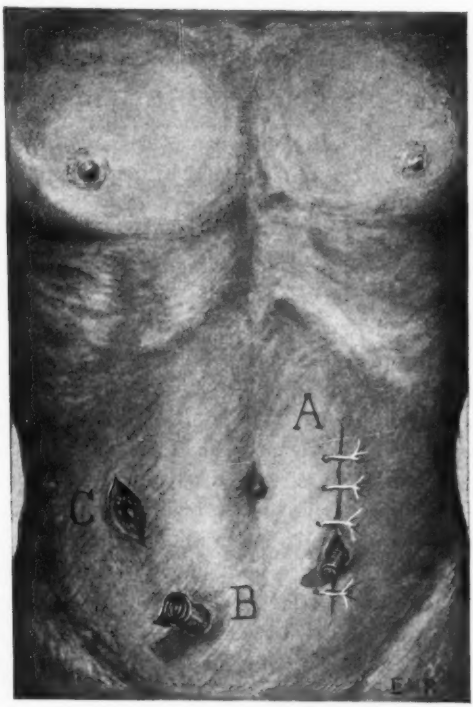

Fig. 524.—The working incision: *A* is shown closed. A small drain has been introduced down to the sigmoid. The suprapubic drain (*B*) and cecostomy wound (*C*) are also shown.

rhagic area. There was no thickening in the bowel wall or other evidence of pre-existing disease. No further exploration was made.

The fluid was removed by suction. The rent in the sigmoid was closed with a continuous suture of fine chromic catgut, over which a second, inverting suture was placed. Even after the

second row of sutures had been placed, there was an area of bowel wall beyond the suture line which had a traumatized, devitalized appearance. A stab wound was then made to the right of the midline, in the suprapubic region, through which a rolled rubber was introduced into the bottom of the pelvis, guided by the hand within the abdomen.

The abdomen was then closed in layers of catgut and silkworm-gut. While closing the peritoneum, the area of sigmoid which had been ruptured was brought up into apposition with the peritoneum, an epiploic body was brought through the peritoneum and was included in the peritoneal suture. Before completing the closure, a small rolled rubber drain was introduced through the peritoneum, into contact with the sigmoid. After tying the silkworm-gut sutures, several small strips of rubber were introduced into the fat, one piece between each two sutures.

A right McBurney incision was then made, through which a portion of the cecum was drawn up into the wound, where it was fastened with sutures to the peritoneum, for the purpose of establishing an artificial anus to remove tension from the suture line in the sigmoid.

Immediately following the operation, a tube was placed in the rectum. Then the stomach was washed, after which the patient was returned to bed and placed flat upon his abdomen for gravity drainage, in which position he was kept for two days. There was considerable drainage from the suprapubic drain which necessitated reinforcing of the dressing two hours later. As soon as the patient was fully conscious, the head of his bed was elevated. He was kept comfortable with morphin. During the next few days his stomach was washed at irregular intervals because of eructations. On the day following operation, the cecum was opened with the cautery, giving escape to considerable gas, after which during several weeks gas and fecal matter came from the cecostomy.

On the fourth day, the patient began to pass gas by rectum and on the sixth day had a good movement.

The working incision suppurated, discharging large quan-

tities of pus, and on the tenth day feces were mixed with the pus. From the tenth to the thirtieth day all bowel movements were from the working incision, except a small amount from the cecostomy. On the thirtieth day, following a small enema, feces again came from the rectum, after which natural bowel movements were gradually re-established.

The patient was out of bed on the thirty-ninth day and went home on the forty-sixth, a nurse in charge. At this time neither the cecostomy nor the working incision was closed; there was gas and a small amount of feces from the cecostomy, and from the working incision still pus and some feces, but most of the bowel movement was per rectum.

When next seen, at the writer's office, the cecostomy was closed, also the working incision except a small sinus connecting with the sigmoid. On September 1st this sinus was still open, part of the time would close for three or four days, then would open and discharge a very little watery material with a colon odor.

This case is a very unusual one. The writer has known of rupture of the bowel due to the passage of a rectal bougie, also from sudden distention due to compressed air introduced into the rectum, neither of which would seem to be as dangerous an accident as this one, in which the water bursting through the intestinal wall carried fecal matter and distributed it widely.

In looking back over the case, it seems likely that the omission of any one of the steps taken at the operation might have been followed by the death of the patient.

APPENDICITIS

It has been estimated that in the United States there are about 16,000 deaths annually from appendicitis. This disease, therefore, especially as there is so great variance of opinion on the subject among physicians, should be constantly discussed until unanimity of opinion and uniformity of treatment result.

The writer is strongly of the opinion that appendicitis should always be considered a surgical disease; that no stage of the disease should be treated by the ice-cap or by other forms of expectant treatment; that operation on all chronic and recurring cases, and immediate operation upon all acute cases, however mild, would reduce the mortality from appendicitis and would greatly lessen the occurrence of such dangerous complications as abscesses, general peritonitis, portal thrombophlebitis, and of such annoying complications as fecal fistulæ, chronic sinuses, postoperative herniæ; that the principal cause of the high death rate is not surgery, but the postponing of it; that to postpone operation until symptoms become urgent is, in the words of the late Dr. John B. Murphy, "gambling with death," that operation should always be advised except when the patient has become moribund, as evidenced by cold and dusky colored extremities, a flickering pulse, and a silent abdomen.

The writer wishes to discuss particularly suppurative and gangrenous appendicitis. In suppurative appendicitis, suppuration may be confined within the lumen of the appendix, or it may have passed by lymphatic extension or by perforation of a concretion into the immediate neighborhood to form an abscess, or more widely to start a diffuse peritonitis. Even in mild cases, bacteria have probably penetrated the walls and are present upon the peritoneal surface of the appendix and in the immediate neighborhood.

Gangrenous appendicitis is a different disease. It is the

death of a part of, or of the whole of, the appendix by interference with its circulation, possibly by arterial embolism, generally by septic thrombophlebitis of the veins of the appendix. When in appendicitis the pulse rate is fast in proportion to the severity of other symptoms, gangrenous appendicitis is probable; when, in addition, the patient has had a chill, gangrene is certain. The chill means the sudden release into the portal venous system of bacterial products from the site of the thrombophlebitis.

In the majority of cases, fortunately, thrombophlebitis is found at operation to be limited to the walls of the appendix; in others to have extended into the veins of the mesenteriolum, where it may be recognized by the dark color of, or by the dark streaks in, the mesenteriolum; occasionally to have extended into the colicadextra vein, when death from portal thrombophlebitis is imminent, although not immediate. Even with extensive portal thrombophlebitis the blood-cultures will be negative. A rapid pulse, therefore, is an urgent indication for operation; a chill, in addition, is an imperative indication.

Technic of Operation.—The McBurney incision is the ideal one. The two muscle planes, being split at right angles to each other, will in most cases unite firmly so as not to be followed by herniæ. This incision is preferable for children, also for adults when there is no uncertainty of diagnosis. When, however, the diagnosis is not certain, a right rectus incision should be used. Should the surgeon, after opening the abdomen by the McBurney incision, require more room, he may secure it by prolonging the incision in the external oblique and stretching the internal oblique and transversalis muscles or, as is very rarely necessary, by incision along the semilunar line.

On opening the abdomen, if free pus is present, it is removed by suction; if an abscess be found, it is broken into, the pus removed by suction, and the abscess cavity explored for concretions. Concretions are most frequently associated with abscesses, less frequently with general peritoneal exudates. Whenever the appendix is found to have a hole in its wall, a concretion should be sought. If not removed, concretions are likely to lead to secondary abscesses or to chronic sinuses. As soon as the

appendix is brought into the wound, contact with the raw edges of the wound is prevented, as far as possible, by a gauze sponge, the mesenteriolum is clamped, cut across and tied. In cases of gangrenous appendicitis care should be taken to ligate, if possible, proximal to the point of extension of the thrombosis. Fortunately, this can generally be done. The writer has never, as suggested by Dr. Gerster, traced the thrombosis into the mesentery of the colon, to ligate the vein proximal to the extension of the thrombosis. He has had two deaths from portal thrombophlebitis, one in the series of cases here reported, one before this series began. The appendix is crushed close to its base and ligated in the groove made by the crushing clamp, the catgut ligature being left long so as to support the cecum during the placing of the purse-string. The wound edges are now carefully protected with hot, moist, gauze sponges. A purse-string is placed in the cecum surrounding the base of the appendix, after which the long ends of the appendix ligature are cut, two clamps applied, one over the ligature, one distal to it, the appendix is cut across between the clamps, and the stump is depressed into the wall of the cecum and the purse-string is tightly tied. A line of sutures is now placed which inverts the purse-string into the wall of the cecum. Sometimes, due to edema of the cecum or to gangrene extending from the base of the appendix into the wall of the cecum, it is not possible to place a purse-string. However, it is always possible to invert the edematous or gangrenous cecal wall by a row of sutures placed far enough back to grasp healthy cecal wall. A large area of cecal wall may be safely inverted, the only limitation being interference with the ileocecal junction. It is only by this wide inversion of cecal wall that fecal fistulæ may in some cases be prevented.

Up to this point in the operation, there has been as little intra-abdominal traumatism as possible. In most cases the small intestines have not been seen except the terminal ileum adjacent to the cecum. In no case has an intra-abdominal gauze pack been used.

All cases of appendicitis with secondary abscesses or secondary free pus should be drained. Cases of suppurative or

gangrenous appendicitis, not complicated by suppurative peritonitis, in which the visibly diseased tissues are entirely removed or are inverted into the cecal wall, may often be safely closed without drainage. Formerly it was the writer's custom to drain through the working incision. Quite a good many years ago he saw Dr. William Mayo, in a case of appendicitis complicated by a general peritoneal exudate, remove the appendix, introduce a drain through a stab incision external to the working incision, and close the working incision by suture. The writer has since followed a similar method. After the intestinal suturing has been completed, under the guidance of a finger within the abdomen, a small incision is made external to the working incision, parallel to the direction of the external oblique, through which a clamp is introduced into the abdomen and out again through the working incision, where it grasps the rolled rubber drains, generally two in number, one long, one short, and pulls them through the stab incision, where they are transfixed with a safety-pin. The longer drain is now introduced into the bottom of the pelvis, closely hugging the parietal wall, not between coils of intestine; the shorter drain is introduced into the space to the right of the cecum or into the neighborhood of an evacuated abscess. By this procedure, together with the posture to be described later, complete drainage is secured. Occasionally in women with abscesses in the pelvis, drainage by vaginal puncture is advantageous.

Drainage is a subject of so great importance that its further discussion seems advisable. Drainage becomes a much simpler matter after the focus of infection has been removed, than it was at the time the surgeon first looked into the abdomen, because, after removal of the diseased appendix and evacuation of the abscess, if present, the life of the patient depends primarily upon the antibacterial reaction of the peritoneum, a reaction that has been augmenting since the beginning of the attack, to a much less degree upon drains. We should also remember that there is a great difference between draining the peritoneal cavity and the isolation of a highly infected local area, such as that of an appendix abscess.

Of the materials used for drains, rubber or gauze is most frequently used. The writer uses loosely rolled rubber, believing that it drains effectually, that it can be used in small bulk, and therefore requires a small aperture in the abdominal wall for its exit, thus diminishing the probability of postoperative hernia. He also always drains through a stab incision, external to the working incision, thus allowing the working incision to be closed, which further diminishes the probability of postoperative hernia, as well as allows the drains to be placed along the parietal wall, not between coils of intestine.

The writer is opposed to using gauze. Gauze seems to act as a drain for a short time, after which it has lost its capillarity, due to the meshes being filled with pus and coagulated lymph, and that peritoneal reaction then walls it off from the general peritoneal cavity. Should any surgeon believe that the area of an appendix abscess, because of its high degree of infection, needs to be thus isolated with gauze, his position would seem to be rational. The writer believes that such isolation is not necessary, especially for the reason that nature had before operation shown its ability to isolate this area unaided. The use of gauze to drain a general peritoneal exudate, however, seems not to be rational. It is employing a walling off method where general cavity drainage is desired. Of course any foreign body, whether gauze or rubber, sooner or later becomes walled off by peritoneal reaction; but it is probable that gauze is, of the two, much sooner walled off.

Those who use gauze, generally use it in considerable bulk and, unfortunately, also generally bring the gauze out through the working incision. These large gauze drains prolong convalescence, give patients great discomfort when being removed, increase the danger of fecal fistulæ, and are very frequently followed by ventral hernias. The writer believes that the use of loosely rolled rubber is attended with less undesirable complications, both immediate and remote, is attended with less pain while being removed, helps to shorten convalescence, and is less likely to be followed by fecal fistulæ and postoperative herniæ.

By whatever method of drainage, there is an occasional

secondary abscess requiring secondary operation. In the series presented, two patients had secondary abscesses, one to the left of the sigmoid, one subphrenic.

The peritoneum, muscles, and fascia of the external oblique are separately closed with catgut, the skin and fat with two or three silkworm-gut sutures which grasp also the edges of the fascia of the external oblique, after which a small strip of rubber tissue is introduced between each two silkworm-gut stitches down to, occasionally through, the external oblique. Following this closure there is very often suppuration and sloughing of the fat, but the peritoneum, muscles, and fascia of the external oblique unite. There is seldom hernia through the working incision and seldom at the site of the stab drain.

A copious dressing is now applied, the patient is returned to bed and placed in the right Sims' position, which position, although very uncomfortable, is maintained almost constantly during two or three days. This valuable method of securing gravity drainage was learned from Dr. Edward J. Ill.

The stab drains are not disturbed for seven days—until granulations have had time to form. By this time there should be very little drainage from the stab wound. If there be much drainage, one should suspect a secondary abscess connected with, but not adequately drained by, the rolled rubber, in which case the drain should be left longer. On the other hand, by the end of the first week, due to secondary infection of the fat, there is apt to be profuse drainage from the working incision. At this stage the silkworm-gut stitches need not be removed, adequate drainage taking place between the stitches.

A small portion, an inch or two, of the rolled rubber drains is pulled out and cut off each day, the entire drain being out before, or by the end of, the second week. By the end of the third week the wounds are generally closed or reduced to superficial granulating wounds.

During the past twelve years the writer has operated upon 383 cases of acute appendicitis occurring in his private practice, all operated upon as emergency cases, of which 152 were gangrenous or suppurative and were drained. The average time in

bed was ten days for the uncomplicated cases, 20.2 days for those requiring intra-abdominal drainage. There were no fecal fistulas; the writer believes that their non-occurrence was due to the method of inverting the cecum and to the absence of gauze from the drains. The number of postoperative hernias the writer cannot give, as the cases have not all been seen since leaving the hospital. Of those seen, however, very few had hernias. There were 6 deaths, a mortality slightly more than $1\frac{1}{2}$ per cent. for the series and slightly less than 4 per cent. for the pus cases. Of the deaths, two—both women past fifty years of age—died shortly after operation, one within an hour, one after fifteen hours; one—a young man aged thirty-nine—died of portal thrombophlebitis; he had had three chills before operation, temperature 104.6° F., pulse 120; his appendix was gangrenous; after operation chills continued, he became deeply jaundiced on the third day, died on the sixth day; one—a man aged thirty-two—died of postoperative obstruction of the bowel on the sixteenth day after operation, in spite of a secondary operation on the fifteenth day; the writer thinks that this death might have been prevented by earlier secondary operation, but obstruction was not complete until the fifteenth day, seemed always on the point of spontaneous cure; one other case of postoperative obstruction was relieved by prompt secondary operation.

The ages of those who died were thirty-two, thirty-nine, forty-eight, fifty, fifty-two, sixty. None of the children died. This is surprising, inasmuch as appendicitis is generally considered to be more fatal in the young.

TECHNIC OF CHOLECYSTECTOMY

THE technical difficulty of cholecystectomy sometimes leads surgeons to elect cholecystostomy, when they know that cholecystectomy would otherwise be preferable. The writer wishes to outline a technic of chloecystectomy which is as easily performed as cholecystostomy and as quickly done. No claim for originality is made. The technic is the gradual result of assembling what seemed to be the more desirable, and the elimination of what seemed to be the less desirable.

Dorsal elevation by sand-bag or other mechanical device is not used because not necessary.

The position of the operator is important. The writer, being left handed, stands on the right side of the patient; his colleague, Dr. Sprague, being right handed, after having opened and having explored the abdomen, stands on the left side. This choice of position allows the less dextrous hand to be used within the abdomen for support and traction, as will be fully explained later. The hand, once introduced, is left in position until the cystic duct has been severed and the cystic vessels secured. When the hand comes out of the abdomen, it brings the gall-bladder with it.

The incision is the customary right rectus incision. Its length should be sufficient for easy working. It is especially necessary that it be prolonged sufficiently far upward to expose and to facilitate dissection of the ducts and vessels. If prolonged too far downward, protruding viscera are apt to embarrass the operator.

Abdominal packs are seldom necessary. They are undesirable because of peritoneal traumatism. After a little experience one finds himself able in most cases to operate quite as easily without as with packs. When, however, the patient is very fat or when anesthesia is incomplete, packs facilitate the operation.

A pack is advisable when the gall-bladder is edematous and distended, or when gangrenous, so as to seem likely to rupture and spill its infectious contents.

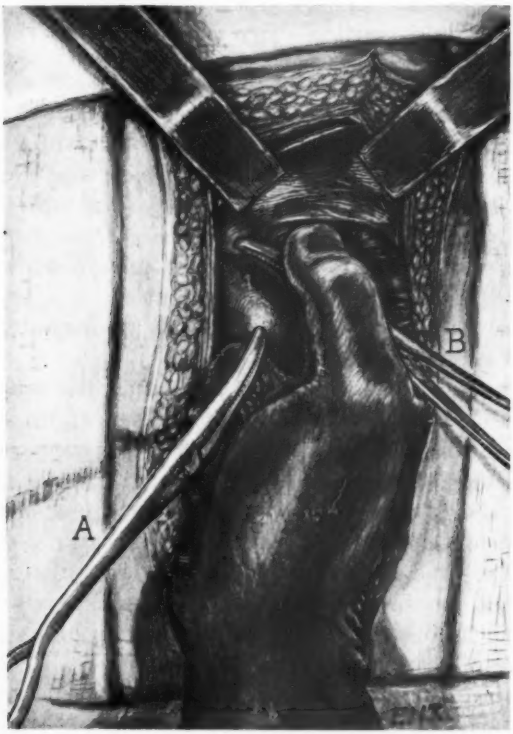

Fig. 525.—Clamp *A* grasps fundus of gall-bladder. Tips of two fingers are in foramen of Winslow. Clamp *B*, grasping the ampulla of gall-bladder, is exerting traction. Retractors expose area beneath which lie the vessels and the junction of the common and cystic ducts. This position of hand and fingers is maintained until the cystic duct and vessels have been secured.

Rotation of the liver is not done. It adds slightly to the ease of operation in thin patients, but in fat patients rotation is a detriment by interposing the rotated liver between the surgeon's eyes and working hand, and the field of operation—the ducts.

Adhesions surrounding the gall-bladder, if present, are thoroughly separated by the fingers, exposing the gall-bladder.

The fundus of the gall-bladder is grasped with a curved clamp and downward traction made. The less dextrous hand, in the writer's case the right hand, is introduced into the abdomen and the index and middle fingers passed through the foramen of Winslow, beneath the ducts. The clamp grasping the gall-bladder is transferred to the hand within the abdomen, being held by pressure of the thumb against the hand, downward traction being thus maintained, and the other hand being left free.

Two abdominal retractors, dipped in hot water, are introduced and held by an assistant, one retractor on either side, so as to expose the region of the ducts. The blade of each retractor should be long enough to be in contact with Glisson's capsule. A second clamp now grasps the gall-bladder lower down, in the region of the ampulla; downward traction is made upon it and the clamp transferred to the hand within the abdomen. Downward traction being now maintained with the second clamp, the clamp first applied has lost its usefulness. It may be removed, although it is generally left, for fear that the gall-bladder may be ruptured at the place weakened by the grasp of the clamp.

When the gall-bladder is gangrenous or is edematous from acute cholecystitis, it is often friable and may be torn by the grasp of the clamp applied for traction. It is better in such cases to omit the clamp; the dissection can be accomplished almost as easily—although not quite as safely—without, as with, traction.

We are now ready to dissect the ducts and vessels. We have downward traction away from the liver and right hepatic vein, forward pressure by the two fingers within the foramen of Winslow, the omentum and stomach excluded from the field of operation by the hand within the abdomen, the falciform ligament on the inner side, and the liver on the outer side held apart by the two retractors held by the assistant.

The working hand of the operator now thrusts a curved clamp gently into Glisson's capsule, and by blunt dissection gradually but quickly exposes and isolates the cystic duct and traces it to its junction with the common duct. Note is here

made of the appearance of the cystic duct; if it be neither thickened nor dilated, it is normal; if it be dilated, a stone has passed through and should be sought in the common duct. The cystic duct is doubly clamped close to the common duct—the proximal clamp as in the illustration—so as to facilitate later application of a ligature, and the duct cut across between the clamps. The

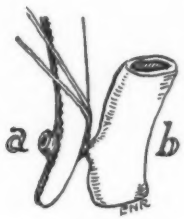

Fig. 526.—*a*, Cystic duct; *b*, common duct. Diagrammatic representation of method of applying clamp to cystic duct (*a*) so that ligature cannot slip while being tied.

sweep of a finger momentarily removed from the foramen of Winslow now partly separates the posterior peritoneal fold from the lower part of the gall-bladder, thus facilitating later dissertion of the cystic vessels. This step, although helpful, is not always successfully executed. It is not essential.

Forward pressure by the fingers within the foramen of Winslow and downward traction being maintained, after blunt dissection, the cystic vessels are clamped and severed from the gall-bladder. These vessels are not always identified, but are secured by mass grasp of a clamp close to the gall-bladder. Should there be bleeding, due to having missed the cystic artery when placing the clamp, the bleeding is controlled digitally between the two fingers within the foramen of Winslow and the thumb, and safely clamped after the blood has been sponged away.

The fingers are now removed from the foramen of Winslow and inserted between the gall-bladder and the liver. By blunt dissection they quickly peel out the gall-bladder, this dissection being often aided with a knife.

The cystic vessels are tied with catgut, followed by ligation of the cystic duct, which is doubly tied.

A rolled rubber drain is now introduced through a stab wound to the right of the working incision, deep into Morrison's pouch. Drainage is advisable because of the occasional leakage of bile.

The abdomen is closed in layers, as usual, with catgut and silkworm-gut.

CLINIC OF DR. RICHARD H. DIEFFENBACH

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MANAGEMENT OF CERTAIN PULMONARY AND PLEURAL INJURIES

SURGERY of the chest is still in an undeveloped state, especially as regards indications for operative interference. It will probably take a considerable length of time before the indications will even in a measure approach the present status of those in abdominal surgery. The war gave chest surgery a marked impetus, especially in traumatic work, and it may not be amiss to consider this department rather than the more unsettled and debatable features.

Trauma in chest surgery, as in all surgery, is forming a larger and larger percentage of the whole as our age is becoming more and more mechanical. There are, therefore, really three good reasons for having some conception concerning traumatic chest work:

1. The indications as a whole are better defined.
2. It is often of the utmost importance that action should be prompt.
3. The cases are continually on the increase.

In injuries of the lung and pleura the primary reaction depends on the interference with the physics and physiology of the chest and contained organs. This is true, of course, of all injuries, no matter what region, but is more striking in the chest because the contained organs can suspend function for but a short period of time without fatal results. Likewise the negative pressure in the pleural cavity is unique for this region and absolutely essential to perfect function. Whereas in other regions secondary infection following injury is a primary consideration except in cases of hemorrhage, one might suggest that at times

in chest cases secondary infection is really secondary, although it must be combated just as assiduously.

Since in the chest slight injuries may cause grave results, it will probably be best to approach the subject from the angle of results rather than cause.

A condition comparable to commotio cerebri may occur following chest injury without evidence of trauma. It may be the result of a blunt force or a nearby explosion. The patient is unconscious, the respiration shallow, the pulse small, irregular, or absent; in fact, all symptoms of grave shock. This may clear up shortly and nothing remain as a result, just as in commotio cerebri. It is to be explained on the basis of temporary derangement of the vagus, sympathetics, etc. If the injury is severe enough, the patient may not recover, and very little may be found to explain the death. One explanation, which I have never seen mentioned, has occurred to me. In those cases of death due to shock from explosion the sudden impact of the force traveling down the open glottis through the bronchi into the lungs may produce a general commotio through the entire bronchial tree and chest. Experiments in this direction would be of interest.

Contusions of the lungs are far more common than we think. They are due to falls, blows, crushes, or shot wounds of the chest walls not entering the pleural cavity. The trauma causes interstitial hemorrhage in the lung tissue. Signs of consolidation or fluid supervene, usually demonstrable by *x*-ray, and treated by rest. Danger lies in the fact that the lung tissue may be sufficiently devitalized by interstitial hemorrhage to cause breaking down and abscess formation, with or without complicating empyema. This condition should not be confused with penetrating gun-shot wounds in which there is a primary destruction of the lung tissue and the added factor of probable infection due to the passing or presence of the projectile.

Case I.—J. W., male, colored, aged forty-six years. Admitted June 22, 1926 at 9.45 P. M. History: Patient fell this morning off scaffold about 12 feet in height and hit ribs against banister.

Went into cellar and remained there all day. Brought to hospital by police ambulance. Complains of pain, increased by inspiration and motion, in right axillary region and over entire lower chest. Strapped in receiving room. No other injury found.

Physical Examination.—Colored male adult, well developed, with marked dyspnea and acutely ill. Head: Eyes, pupils

Fig. 527.—Taken June 23, 1926, and shows mottling (interstitial hemorrhage) in region of middle lobe, right lung. Heart slightly displaced to left.

equal and regular, react to L. and A. Motility normal. Nose and ears negative. Mouth: Teeth in bad condition. Tongue: Coated, protrudes in midline, no tremors. Throat negative. Neck negative. Chest: Heart, regular sounds of fair quality, no murmurs heard. Lungs: On right side there is a tenderness on pressing in axillary region and breath sounds are distant with slight dulness. Abdomen: No masses, rigidity, or tenderness. Provisional diagnosis: Fractured ribs, right side. Pleural

effusion (blood?). Urine negative. Wassermann negative. Temperature on admission 101° F., pulse 104, respiration 42. Figure 527, taken June 23, 1926, shows mottling (interstitial hemorrhage) in region of middle lobe, right lung. Heart slightly displaced to left.

At end of one week temperature receded to 99° F., pulse 90, respiration 30, and gradually dropped to normal, so that patient could be discharged on twenty-first day of illness cured.

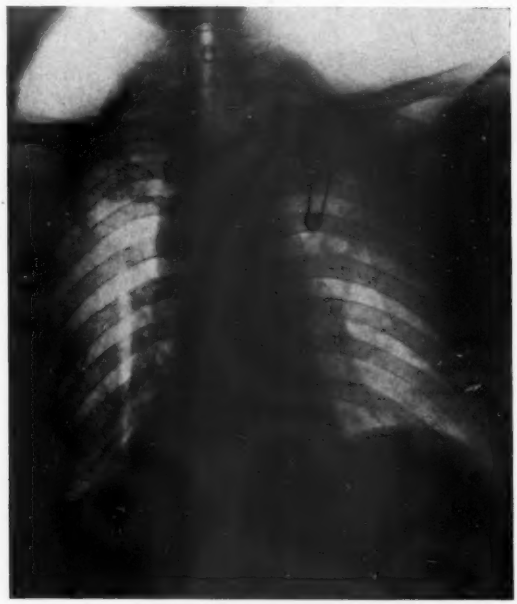

Fig. 528.—Taken July 2, 1926, shows normal lung tissue and heart *in situ*.

Figure 528, taken July 2, 1926, shows normal lung tissue and heart *in situ*.

During the first week patient complained of pain in right chest, very severe at times, and aggravated by cough. Could readily be controlled by codein.

Figure 527 is of interest, as it shows interstitial hemorrhage. This might have been sufficient to devitalize lung tissue and

produce an infection. Fortunately, it resolved without any treatment besides rest. A case of this type not clearing up promptly should be observed for months because of danger of late hemo- or pneumothorax, hemoptysis, or infection.

Lung rupture without a penetrating wound is usually the result of a blunt, crushing force such as occurs when run over by automobile.

In children, in whom the chest wall is still very pliable, we may find a rupture of the lung without any evidence of external injury. We will report 2 such cases. In our experience they are often accompanied by tension pneumothorax. In no other field of surgery, with perhaps the exception of hemorrhage, can with proper treatment, such brilliant and satisfactory results be obtained. In tension pneumothorax a valve-like opening between the lung (bronchus) and pleural cavity exists, allowing air to enter the pleural space with no means of escape. Grunting, forced expiration due to pain and accompanying cough, force greater amounts of air through this opening and increase the intrapleural pressure until it pushes the heart and mediastinum to the opposite side, compressing the uninjured lung, and in time, if unrelieved, causing death.

The treatment is simple, namely, paracentesis thoracis, letting out the air. It is best done by means of a trocar and cannula with an offset such as the Ochsner gall-bladder trocar. To the offset a rubber tube about 3 feet long is attached, and its distal end placed under water. The vessel containing the fluid should be about 24 inches or more lower than the cannula in the chest. When the chest wall is punctured and the trocar withdrawn to the distal end of the cannula, air bubbles will arise in the water, showing that a positive pressure exists. When the bubbles cease, the cannula is withdrawn. This is also an excellent method for removing fluid or pus from the pleural cavity. It was first described to me by Dr. Howard Lilienthal.

There is no danger of puncturing the lung because the trocar is in the cannula. There is no excessive negative pressure because the flow is established by gravity, and, in addition, it affords, when fluid is present, a criterion as to pleural adhesions.

If the pleura is fixed the fluid flows with greater difficulty, and when neutral pressure is established the cavity cannot be further emptied.

In tension pneumothorax it may be necessary to repeat this procedure several times, or if the fluid accumulates too rapidly, a small tube may be introduced intercostally and carried under water as before, thus establishing a continuous exit for the accumulating air.

Case II.—F. G., admitted June 28, 1923, boy, seven years of age, white. Brought to hospital in private taxi. History obtained from eye-witness. Struck by automobile. Rear wheel passed over chest. Spit up small amount of blood.

Examination on Admission.—Patient in shock, semicomatose, breathing with difficulty. Apparently acutely ill, very pale.

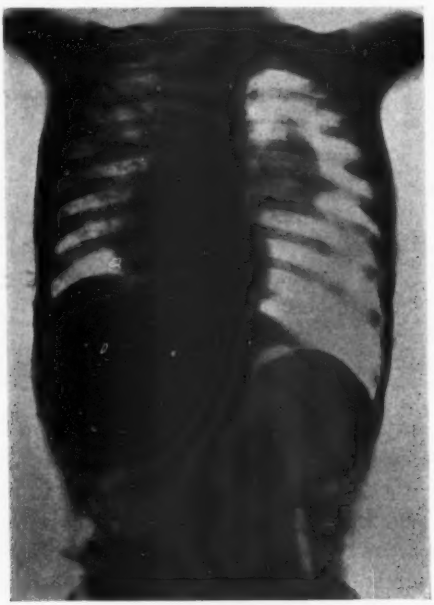

Fig. 529.—Taken July 2, 1923. Pneumothorax of entire left chest. Depressed diaphragm. Heart displaced to right side. No ribs fractured.

Head negative. Eyes: Pupils contracted, regular, and equal. React sluggishly to light and accommodation. Nose and ears negative. Mouth: Teeth poor. Chest: Expansion shallow. Lungs: No dulness. Small moist râles scattered throughout. Heart negative. Abdomen slightly rigid all over. Genitals and extremities negative. Reflexes not elicited. Glands: No adenopathy.

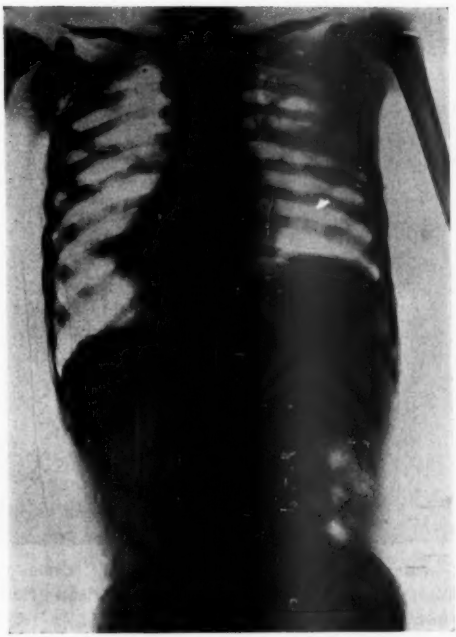

Fig. 530.—Taken July 5, 1923. Pneumothorax still present. Heart beginning to resume normal position.

Provisional Diagnosis.—Fracture of ribs. Internal injuries. (Possible rupture of abdominal viscus.) Pulse 136, temperature 99° F., respiration 48, urine negative. Next morning patient vomited brown colored fluid containing food and was delirious for a few hours. June 29th and 30th pulse ranged from 100 to 120; temperature from 99° to 100$\frac{2}{5}$° F.; respiration from 30 to 38.

This continued without marked change until July 2d, when pulse rose to 140, respiration 66, temperature 101⅘° F. Examination of chest at time: Left chest very tympanitic and bulging. Heart displaced to right, bronchial breathing at apex, respiration almost inaudible over rest of chest. Figure 529, taken July 2, 1923, pneumothorax of entire left chest. Depressed diaphragm. Heart displaced to right side. No ribs fractured.

Fig. 531.—Film No. 9557 of Case No. A58,245. Taken July 9, 1923. One week after paracentesis. Pneumothorax absorbed. Heart and diaphragm back in position.

Needle was introduced into left chest and air expelled under pressure. Apex-beat could now be felt to left of sternum. Slight relief of dyspnea. Later a small amount of blood-streaked sputum expectorated. Only one paracentesis was performed. Figure 530, film No. 9418 of this case, taken July 5, 1923. Pneumothorax still present. Heart beginning to resume normal position. July 8th, temperature 98.6° F., pulse 100, respiration 28. Discharged July 20th cured. Figure 531, film No. 9557 of

this case, taken July 9, 1923. One week after paracentesis. Pneumothorax absorbed. Heart and diaphragm back in position.

These measures failing, an intercostal exploration should be performed, the torn lobe grasped, pulled out of the chest wall, sutured with interrupted catgut, returned, and after reinflating lung, chest wall closed air-tight.

Case III.—B. L., female, admitted December 16, 1923 at 12.10 P. M. White, age thirteen years. Note in receiving room: Hit by automobile. Conscious and rational, but in shock. Complains of a great deal of pain in back. Spit up some blood, which patient says came from a broken tooth. Evidence of injury to nose, brush wounds about lower extremities.

Provisional diagnosis: Fractured ribs and internal injuries. Physical examination: General appearance, well-developed girl, lying in bed, dyspneic, cyanosed, and apparently severely injured. In shock. Head negative. Eyes: Pupils dilated, but react to L. and A. Nose and ears negative. Mouth: Teeth good, gums bleeding where tooth was apparently knocked out. Tongue and pharynx negative. Chest: Lung expansion limited on left. Thrill felt over right chest. Left chest somewhat tympanitic both front and back. There are numerous bubbling râles over right chest. Breath sounds scarcely audible over left chest. Heart: Displaced to right. Sounds very faint and distant at apex; also weak at base and rapid, but no murmurs heard. Pulse, rapid and weak. Abdomen: Some rigidity in upper abdomen, no masses felt. Genitals: Not examined. Extremities: Has abrasions on right thigh, otherwise negative. Reflexes active and equal. Diagnosis: Left-sided hemopneumothorax with ruptured lung and hemorrhage. Urine negative. Hemoglobin 80 per cent. Operation December 16, 1923, at 5 P. M. under general ether anesthetic. Tension pneumothorax relieved with trocar. Intercostal thoracotomy performed. Large amount of free blood removed from pleural cavity. No free bleeding point found. Patient in shock. Chest wound quickly closed with three pericostal stitches to bring ribs together, muscles sutured, and skin closed. A transfusion of 300 c.c. of

blood was given at the close of the operation. Patient died same day at 7.40 P. M.

Autopsy: Findings negative except chest. Left pleural cavity contained a little fresh blood, collapsed lung, and no adhesions. The left lung, anterior border, upper lobe, shows a laceration about 3½ inches in length, which is stuck together with fresh fibrin, but is easily separated. The surrounding lung shows patchy hemorrhages. Larger bronchi contained considerable blood. Structures at hilus free and clear, no emphysema. Right lung shows occasional, scattered hemorrhages. On section, dry, free, and clear. Cause of death: Traumatism, automobile injuries, pneumohemothorax, and lacerations of lung. Comment: In this case it would probably have been wiser, first to attempt relieving the tension pneumothorax by paracentesis, repeated or continuous. The object of the exploratory thoracotomy was to control hemorrhage.

It is important in exploring the chest to have some means of inflating the lungs. It aids in locating the rent and prevents mediastinal flapping, etc. It need not be an elaborate apparatus. Simple intrapharyngeal insufflation, as employed in anesthesia for tonsillectomy, will suffice. By holding the lips tightly closed the lungs can readily be inflated.

In extensive wounds of the chest wall a portion of the lung tissue may be caught in the wound and held there. If of recent occurrence it should be washed with normal salt solution and returned to the chest cavity by manually expressing the air in the exposed portion. The lung subsequently inflated and the chest wall closed air-tight. If the prolapsed portion has been exposed for a period of time, and infection and gangrene suspected, it should not be replaced, but sutured to the chest wall and removed by cautery. Later, after the infection has subsided and adhesions formed, a plan for its return can be formulated. This last condition is most unusual in civil practice.

All large, gaping chest wall wounds allowing external air to enter the pleural cavity, after proper cleansing, should immediately be closed air-tight (if possible) over an inflated lung. Failing this, or fearing infection, pack wound after partially

inflating lung and cover with air-tight dressing. These wide-open wounds must be closed early because of the danger of mediastinal flapping, lowering body temperature through wound ventilation, infection, etc. The scope of this article is too small to go into minute detail. Suffice it to say that suturing these wounds is one of the first principles of chest surgery.

Penetrating wounds of the chest wall and lungs must be considered in relation to their site and the resulting complications. A bullet wound severing a large vessel at the root of the lung will cause death in a short time and may be beyond surgical aid. A small wound in the periphery may cause no noticeable damage. It will, therefore, be best to discuss the treatment under the heading of the results and here mention but a few generalities. Projectiles passing through the chest and not lodging there are less liable to cause infection than those remaining. The carrying in of clothing, etc., by the projectile is very liable to produce infection. Bone splinters may act as foreign bodies and irritants. On the whole, it may be stated that devitalized tissue is more potent as an agent for infection than a few bacteria.

In spite of the variety of lung and pleural injuries there are, as abovementioned, certain pathological results which are the essentials of all chest injuries. These will now be considered briefly.

Opening of the chest wall or rupturing the lung permits air to enter the pleural cavity, with a resulting pneumothorax. That in itself is not always an alarming condition and may in a measure be salutary. Collapsed lung bleeds less readily than expanded. It should, however, be recognized and the case carefully observed to obviate an impending tension pneumothorax, etc.

A simple closed pneumothorax may be present without any subjective symptoms except possibly a slight dyspnea. *x*-Ray here as in all chest work is invaluable. Other cases may after overcoming the initial shock show dyspnea, rapid pulse, cyanosis, pain, labored respiration, etc., physical signs, familiar to all, and *x*-ray are the clinching factors.

If a tension pneumothorax develops, all the symptoms become graver, temperature rises, respiration increases in fre-

quency, and is labored, pulse becomes rapid and thready. Physical examination shows heart displaced to the opposite side, etc. The pressure may become so severe that the diaphragm is depressed, inverted. In some cases the signs and symptoms may be predominatingly abdominal and a laparotomy performed. Such a case is here reported.

Case IV.—J. D., boy aged ten years, white. Brought to hospital in private automobile. History: Was hit by one automobile, got up and ran, and was struck by second car. Findings: Laceration behind right ear, brush wound right side of face, right hand, and right knee. Bleeding from mouth. Fracture of fourth and fifth ribs on left side (not found in autopsy), subcutaneous emphysema. Pulse 130 and feeble. Breathing short and grunting. First aid: Two horsehair sutures to laceration behind right ear, chest strapped, 15 ♏ of adrenalin.

Physical Examination.—Fairly well-nourished white boy, apparently in shock, pale, expiratory grunt. Head: Scalp negative. Eyes: Pupils equal, react to light and accommodation, eyeballs turned to left and upward, no nystagmus or subconjunctival hemorrhage. Ears: No bleeding; laceration behind right ear. Nose negative. Mouth: Mucous membrane pale. Tongue protrudes in straight line, dry blood on lips. Face Brush burns of face, no facial weakness, double vision present. Neck negative. Chest: Fracture of left ribs, subcutaneous emphysema. Lungs: No evidence of blood in pleural cavity. Otherwise negative. Heart: Feeble and rapid, no murmurs. Abdomen: Rigidity of both recti, tenderness in upper left quadrant, dulness in both flanks. Slight distention. Extremities: Brush burn of right hand, laceration of right index-finger. Reflexes: All deep reflexes equally exaggerated, bilateral Babinski, no ankle-clonus. Provisional diagnosis: Concussion with possible fractured skull, intraperitoneal hemorrhage, ruptured spleen. Urine negative. Blood-count 1,028,000 red cells. Hemoglobin 40 per cent. Pulse on admission to ward at 9.30 P. M. 120 (taken every fifteen minutes), at 11.15 P. M. was 180. Blood-pressure readings: at 10 P. M. was 120; at 10.30 P. M. was

102; at 11 P. M. was 122; at 11.30 P. M. was 120. Respirations: 10 P. M., 70; 10.30 P. M., 48; 11 P. M., 64.

This patient was seen by several physicians and surgeons, and in spite of the subcutaneous emphysema, supposed fractured ribs, high rate of grunting respiration, and sustained blood-pressure an exploratory laparotomy was decided on and performed. The abdomen proved to be negative. A blood transfusion of 600 c.c. was given. A spinal tap proved negative, and the patient died at 8.25 A. M. the following morning.

An outline of the autopsy follows: Only the important findings are reported. External examination: Same as under findings. Abdomen: Extensive distention of the stomach with gas. No blood in abdominal cavity. Diaphragm on right side at fourth interspace; on left side everted and turned downward. Rest of abdominal organs negative except pale in color. Urinary tract negative. Chest: Left pleural cavity contains considerable blood (about 5 dipperfuls) and air. Left lung collapsed. Right pleural cavity free from blood and adhesions. Lower lobe of left lung shows extensive laceration of its posterior border. Hilus structures free and clear. No fractured ribs. Subcutaneous emphysema in left mammary region. Pathologist, Harrison S. Martland.

The above case did not come under my observation until after death. It was so instructive, however, that I felt that it should be here included. I feel the error lay in admitting this case to the head service on the supposition that the chief injury was to the brain.

Subcutaneous emphysema need not necessarily predicate a lung injury. If subcutaneous and spreading, it will usually subside with rest and measures combating cough, forced expiration, etc. Morphin has here proved of great value. If caused by a rent at the root of the lung and entering mediastinum, especially in combination with tension pneumothorax, serious consequences may result. The emphysema usually appears suprasternally, where it may be incised and drained, so to speak, while general measures are carried out to improve the patient's condition.

In hemothorax the bleeding may come from the lung or chest wall. There is a marked difference. Pulmonary blood-clots more rapidly, the collapsed lung tends to hemostasis, and the pulmonary blood-pressure is about one-third of that of the general circulation. Many cases tend toward spontaneous cessation. If there is increasing hemorrhage, as shown by rising pulse and respiration rate, *x*-ray, and general signs of hemorrhage, the chest must be opened and the bleeding controlled by ligation or suture. If the lung tissue is very ragged, a resection may be indicated, followed by suture. After the hemorrhage has been controlled, remove clots, etc., from the pleural cavity, inflate lung, and suture chest air-tight.

Frequently hemo- and pneumothorax coexist. The treatment is the same. Whereas a hemopneumothorax is adventitious for secondary pleural infection, it aids in arresting infection in the lung tissue itself.

In civil life the vast majority of hemothoracies reabsorb spontaneously. A prime requisite is sterility. If after from seven to ten days no absorption seems to be taking place, a small amount, 30 to 50 c.c., aspirated, will often cause rapid absorption of the remainder. The entire process may take months. Infection is very serious not only because of the large field, but of the tendency to the formation of thick pleural adhesions, later leading to deformity, pain, and invalidism. It should be treated as an empyema, and early. It may be difficult to judge if infection has supervened or not. The following is a general rule: The respiration rate should begin to diminish at the end of two days and reach normal in from eight to ten days. The pulse frequency should reach normal in two days. The temperature often exists longer, but need not cause alarm if pulse and respiration are not up. It is due to local pulmonary reaction, inflammation, and absorption of blood. There has been considerable debate and experimentation regarding the clotting of blood in the pleural cavity. It undoubtedly clots and expresses serum. Later the pleura pores out an exudate, which assists in absorbing the clot.

The more one sees of penetrating chest wounds, the more one

is led to feel that they should be explored by an intercostal thoracotomy if serous injury is suspected. This is especially true of low chest wounds in which the diaphragm may have been penetrated and abdominal organs injured. This is not such a formidable procedure if done with a positive pressure anesthesia apparatus.

The incision is placed in the seventh or eighth interspace, rib spreader inserted, lung inspected, and wounds then, or after repairing abdominal injuries, treated. If a wound in the diaphragm is found, it should be enlarged, and the underlying organs inspected, treated, repaired, etc. The diaphragm is then sutured, the lung, if not previously attended to, repaired, lung inflated, and air-tight closure of chest wall. This procedure may have to be modified according to infection, etc. Appended case illustrates results from neglect of exploratory operation.

Case V.—History: Patient claims to have been shot by husband. Shooting occurred at her home. Patient more or less confused. Physical examination. General appearance: Well developed, well-nourished woman lying in bed. Dyspneic and apparently acutely ill. Head negative. Eyes: Pupils regular, equal, and react to light and accommodation. Nose and ears negative. Mouth: Teeth good, tongue and pharynx negative. Chest: Expansion somewhat limited at right base. Lungs: Dulness and bubbling râles at right base; otherwise negative. Heart negative. Abdomen: No tenderness, masses, or rigidity. No organs felt. Vaginal not done. Extremities negative. Reflexes active and equal. No abnormal reflexes. Diagnosis: Penetrating wound of right chest with hemothorax. Hemoglobin, 3 P. M., 80 per cent.; 5 P. M., 78 per cent.; 7 P. M., 80 per cent.; 11.30 P. M., 80 per cent. Blood-pressure: systolic 100, diastolic 60. Temperature on admission 99° F. Pulse 120. Respiration 30. Day following admission temperature rose to 103° F. Pulse 130. Respiration 44. These gradually subsided and were practically normal on the fourth day. November 28th chest aspirated, 16 ounces of serous fluid obtained. Patient seemed to do fairly well with occasional rise in temperature

until December 2d. Then began to complain of pain in region of gall-bladder and vomited dark green fluid. Examination revealed marked tenderness over gall-bladder region, and an exploratory laparotomy was advised and performed on December 3d. The liver was found to be adherent to the diaphragm, the gall-bladder was markedly distended, thickened, and inflamed. The picture of an acute suppurative process. The gall-bladder was opened and drained, as was also the surrounding liver area.

Patient did not react following operation and died on December 5th.

Autopsy: Dr. Martland, pathologist. Only important points noted below: Wound of entrance apparently in upper inner quadrant on right breast. Healed; a small bluish-black powder tattooing in the skin. Penetrating wound probably went through the fifth interspace, through the pleural cavity without piercing lung, through the dome of the diaphragm on the right side, and entering the upper surface of the right lobe of the liver about 2 inches to the right of junction between the right and left lobes, and then backward and to the right, producing a large encapsulated suppurating track about $4\frac{1}{2}$ inches in length. The bullet leaving the liver at the extreme border of the right lobe of the liver, where it found its exit under the diaphragm between the eighth and ninth ribs. The right lung was collapsed and there was no evidence of pus or any bullet injury. The upper lobe was everywhere dry, free, and clear. Comment: The interesting point in this case is the high entrance point of the bullet causing no injury to lung. It is possible that had this wound been explored and the liver tear packed and drained, the suppuration might have been prevented. It is also interesting to note the acute suppuration of the gall-bladder following a liver infection.

In conclusion, I have here formulated a few generalities which may prove of value:

Differential pressure apparatus in anesthesia, while not absolutely required, is a great aid.

Best to examine patient once and thoroughly. Then not again unless indicated.

In hemothorax take frequent blood-pressure readings and watch hemoglobin.

x-Ray a most valuable asset not only for diagnosis but also for check on increase and decrease of pneumothorax, hemothorax, position of diaphragm, heart, mediastinum, etc.

Pulse and respiration valuable guides.

Absolute rest very important.

Rapidly increasing hemothorax indicates chest wall hemorrhage, or from large vessel at root of lung.

Destruction and devitalization of tissue a great factor in infection.

Through-and-through gunshot wounds less liable to infection than those lodging in lung or chest.

In low chest wounds, especially penetrating, remember subdiaphragmatic organs and do not wait.

A weakening pulse, increasing dulness and flatness, pressing, forceful, grunting respiration, and emphysema over sternal notch are operative indications.

Even slight injuries should be carefully watched on account of late hemorrhage (hemothorax or hemoptysis) or pneumothorax.

Do not employ positive pressure in operating on tension pneumothorax until pressure in chest has been relieved, and relieve same slowly and gradually.

A positive indication for operation is a transdiaphragmatic (transpleural) wound.

Most cases seen after twenty-four hours do not require primary surgical aid.

Open all cases of traumatic lung abscess or gangrene which do not heal in from four to five months.

All foreign bodies causing inflammation, irritation, abscess, or gangrene should be removed.

Do not aspirate a lung abscess unless prepared to drain same within the next few hours. In withdrawing the needle the highly infectious material may cause a severe or even a fatal cellulitis.

CLINIC OF DR. EDWARD J. ILL

ST. MICHAEL'S AND ST. BARNABAS' HOSPITALS,
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RETROFLEXED UTERUS; LACERATION OF THE CERVIX; CHRONIC APPENDICITIS; INTESTINAL STASIS DUE TO BROAD BAND OF ADHESIONS

ON April 26, 1926 Dr. C. Beeling referred to me Mrs. N. P. She had been sick with melancholia for four months. The last baby was born eight months ago (premature at eight months). She had had 4 children previously and 2 accidental abortions. She started with mental depression, was often very irritable, and was gradually getting worse. For a month she was unable to attend to her household duties and had lost 12 to 15 pounds. Her menstruation was regular, lasting five or six days. Her mental condition was worse at such times. An examination showed that her right kidney was much prolapsed. The caput coli is apparently enlarged and filled with gas, which is easily emptied by massage, but promptly refills. The cervix is lacerated, eroted, and everted, which accounted for her constant large amount of leukorrheal discharge, and the uterus is retroflexed. There was a moderate anemia. The urine was negative, blood-pressure 120 over 80. An operation was suggested after her husband assured me that it was impossible to get along with her at home.

She was operated on May 10, 1926. A Sturmdorf operation was done on the cervix after a curettage. A median section showed a very much distended caput coli, filled with hard fecal masses and gas; this in spite of 0.6 of calomel, a saline laxative, and enema the day previous. Above the caput coli about midway to the hepatic flexure there was a broad band of adhesions

coming from the back of the colon, which reduced the lumen very considerably. The adhesion was carefully separated by a shallow incision along the outside of the colon and pushed down to the mesocolon, where it was sewed over with fine chromic catgut. The appendix was now removed and the size of the caput coli was reduced by shirring it up with a suture of fine linen thread along each white line for about 12 cm. A modified Gilliam[1] operation, closure of the abdomen, finished the operation. By modified Gilliam operation we mean a fastening up of the round ligaments after they had been brought through the peritoneum, posterior sheath of the rectus and the rectus muscle, and fastened to the posterior surface of the anterior sheath of the rectus.

An immediate improvement was noted by the nurses. She was very cheerful, had nice things to say to everybody around her. She presented herself for inspection six weeks later, as do all our operative cases, as a well and happy woman. She was again able to attend to her household duties and is rapidly gaining flesh.

This case is one typical of what we see now and then. Mental depression and melancholia, following some weeks after labor with a retroflexed uterus and intestinal stasis. No other form of mental derangement responds so well.

[1] For a report of the results and the technic of our modification of the Gilliam suspension see the American Journal of Obstetrics, Diseases of Women and Children, vol. lxvii, No. 2, 1913.

FIBROID TUMORS. THE INDICATION FOR TREATMENT AND THE CHOICE OF TREATMENT

THE treatment of fibroid tumors by radiation presupposes some intelligence in the patient. Patients of less intelligence, who cannot be made to understand that we are treating fibroid tumors for symptoms only, would still be unhappy if they could feel the tumor, though the symptoms had all passed away. We find that single tumors, not above the size of a child's head and which produce hemorrhage, give us the best results, as will be illustrated by the following cases:

Mrs. T. presented herself on November 25, 1924. She was forty-one years old, menstruated for six or seven days, soiled 7 napkins a day for the first three days, and was quite anemic. For some time she had noticed a mass in her abdomen below the navel. On examination the tumor was 9 cm. above the pubis and 8 cm. wide. For a while she was much relieved from the excessive flow by the use of fluidextract of cotton root, which was given one week before and during the period in 30-drop doses. By September 14, 1925 she was again flowing excessively; the tumor had reached 12 cm. above the pubis and was 12 cm. wide. She now complained of pressure symptoms for ten days before the onset of the flow. She was an intelligent woman and distinctly noticed an increase of the globular shaped tumor. She was radiated at this time and given a 60 per cent. erythema skin dose. On March 17th she presented herself, having ceased menstruation. The tumor could be felt just above the pubis. It could no longer be measured. She was thoroughly well, regained her color, and was very active at her work.

In small tumors that bleed intra-uterine applications of radium have served us very well. It necessitates, however, that the patient be put to bed, take an anesthetic, and have the uterus thoroughly dilated for the introduction of the hollow

glass stem of No. 34 French. The thickness of the wall of this glass stem is 2 mm. and made of the best lead glass and well annealed.

The selection of an operation for fibroid tumors must always be on our mind when once an operation has been decided for it. In large tumors, reaching to near the navel and above, the supravaginal amputation with retention of both ovaries should be our choice. When, however, there is much disease of the cervix, it should be a total extirpation. A chance of wounding the ureter in a total extirpation is very much greater than in a supravaginal amputation. In the supravaginal amputation the incision should be carried just below the os internum. If it is desirable to retain the menstrual function, part of the body of the uterus can be conserved. One must always have some regard for the patient's feeling in this matter. Injury to the ureters will always be avoided if the bladder is pushed down well on the vagina, the incision of the peritoneum having been carried half-way across the broad ligaments.

Larger tumors are more easily removed than the smaller ones by the suprapubic route. It stands to reason that a total extirpation is always called for where there is a remote suspicion of a malignant endometrium. In over 800 operations we have seen but 1 case of carcinoma of the cervix follow supravaginal amputation. The vaginal extirpation is called for, and most valuable, in all cases where there is a foul discharge from the uterus, where the patient has a roomy vagina, and the tumor is not reaching more than half-way between the pubis and the navel. Women with very fat abdomens make the supravaginal amputation technically very difficult. The following is a good illustration of the kind to be selected for vaginal extirpation:

Mrs. C. E. was sent by her doctor, Dr. Messinger, for excessive hemorrhages. She had had 11 children, among them one set of triplets, all females, now married, and having children of their own. She was forty-nine years old. Her abdomen was very sensitive on pressure. She was very anemic. There was a systolic blowing murmur at the apex of her heart, which was transmitted to the axilla. Her pulse rate was about 124. There

was much foul discharge from the vagina. She was a very fat woman, with the tumor reaching above the middle between the pubis and the umbilicus. At the operation it was shown that she had a very large polypus coming from the fundus and that the cervix could be drawn near the vulva. Under constant irrigation the cervix was circumcised and an anterior incision of the vagina made from the cervix to the neck of the bladder. The bladder was well pushed out of the way and both uterine arteries tied from below, as were also uterosacral ligaments. The cervix was amputated high up and the body of uterus gradually removed by morcellations, as was also the polypus. A little over an hour was consumed in the operation. The loss of blood was, indeed, very small, so that there was no change in the number of heart beats per minute. While the lower part of the broad ligaments was ligated with linen thread, the upper part was thus treated with chromic catgut sutures. She made an uninterrupted recovery and presented herself for inspection five weeks later in a very good shape.

I wish to present Mrs. C. P., forty-four years old. She was operated on March 21, 1923 for hemorrhoids, a hyperplastic endometrium, and a fissure in ano. However, she returned again within a year and complained of excessive flow. In another year several small irregularities were discovered about the uterus. Sporadic treatments by various means failed to relieve her. On March 18, 1926 the uterus had reached the size of a goose egg and was studded with small fibroids. She refused any operation and was given a 30 per cent. skin dose of *x*-rays. This promptly checked the hemorrhage, and on June 14, 1926 the uterus is a little larger than normal size. Her general health as a result of a cessation of the flow is very much improved.

Fibroid tumors should not be operated on except for symptoms, and in women after thirty-five they are exceedingly common. Many authors guess at the number. Through the kindness of Mr. Frederick L. Hofmann, the writer was able to learn from a study of the autopsies of the Massachusetts General Hospital and Johns Hopkins Hospital that 27, $\frac{9}{10}$ per cent., of all women after thirty-five years have fibroid tumors. A

report of this interesting work of Mr. Hofmann can be found in a paper read by the writer and published in the New York State Journal of Medicine of October, 1918.

In our records of cancer of the uterus we make cancer the predominating diagnosis and the fibroids an accidental complication. Our indications for operations are always closely drawn. We never operate except for pain or excessive menstruation. Now and then we are called upon to operate because of a nervous woman who can feel the mass and ponders over it.

A possible cancerous degeneration is never an indication with us.[1] When there is a rapid growth of the tumor we remove it for fear of sarcomatous degeneration. Thus far we have seen but 2 cases, 1 of which had developed a sarcoma in the tissue on the line of the fixation of the Leopold-Czerny operation. Distochia produced by fibroids form, of course, an imperative indication for operation, but not until the patient is in labor, as the vast majority of these cases deliver normally after the lower segment of the uterus has been retracted, and the tumor with it.

In years past too little attention was directed to flat sheaths of adhesions, which bound down bowels, thus making the emptying of a bowel only partial. These patients always complain of gas pain, are very neurotic, and travel from one doctor to another. The following is such a case:

Mrs. N. C., thirty years of age; 2 children and 2 induced abortions. She had had severe labors and her last abortion was three years ago. She had not been well for some years. Menstruated regularly, not excessively, but with much backache and legache. She had some leukorrheal discharge. There was constant distress in the epigastrium and much eructation. This difficulty made her very weak, so that she was laid up three or four days at a time. This distress came in attacks and lasted a week at a time. She had pain in both iliacs, more in the right than in the left, was very weak, had frequent urination, as much

[1] See a paper read before the Twenty-sixth Annual Meeting of the American Association of Obstetricians and Gynecologists on Cancer of the Uterus and Fibroid Tumors from a Clinical Standpoint.

as five times during the night. Her urine was entirely negative. A physical examination showed a laceration of the cervix and a very much relaxed perineum. There was much sensitiveness in the right iliac fossa and the caput coli was felt as an enlarged air-filled sac. She was operated on April 21, 1926. The cervix and perineum were repaired, a long right rectus incision shows extensive adhesions just above the caput coli, producing a large dilated cecum. The appendix was removed. The adhesions were separated by a flat incision along the outer white line of the ascending colon. These adhesions immediately retracted to the posterior shelf of the peritoneum. It was remarkable to see how the cecum immediately emptied itself of its contents, of which there was a large amount, in spite of the fact that the patient had had 10 grains of calomel and a saline cathartic the morning before. The outer white line of the caput coli is now sutured to the posterior shelf of the peritoneum with fine chromic catgut sutures. The patient immediately lost all her bad symptoms, and on June 2, 1926 reported herself well.

In cases where there are no adhesions obstructing the emptying of the caput coli, this organ is reduced in size by shirring up the organ along the white lines for from 7 to 12 cm. with fine linen thread or chromic catgut sutures. The following is a good illustration:

Mrs. G. St., twenty-five years old, had 3 children and 2 accidental abortions. Last labor, three and a half years ago, was a dry birth, since which time she has been sick. She menstruated every two or three weeks rather profusely, and has had labor pains during the first three days of the flow. She had an operation on the neck of the womb a couple of years previous to this present time. An examination showed that she had a very sensitive right iliac fossa and the caput coli, filled with gas, can be rolled under the fingers. She was operated on March 24, 1926. There was a marked stricture of the os externum, as the cervix had been amputated. This was dilated to a No. 36 French. She was curetted and the cavity packed with iodoform gauze. On opening the abdomen a very large and distented caput coli was encountered. There was much thickening of the lower end of

the cecum and the appendix was large and seemed solid at the tip end. No adhesions were found along the ascending colon. The appendix was removed and the bowels shirred up for about 7 cm. with fine linen sutures, placed along the white lines. On June 3, 1926 this woman reported herself as very well.

GENERAL ENTEROPTOSIS

Miss K. K. was sent to us about the middle of March by Dr. Nolte. She had been sick for many years with all sorts of abdominal distress. She weighed about 100 pounds, was thirty-three years old, and single. There was no particular menstrual difficulty. She could not eat on account of the formation of gas. An examination showed a very narrow chest, the right kidney was near the right ilium, and the left kidney could be teased down from the lumbar region. She had four large scars on her abdomen, for she had been operated on by at least two

Fig. 532.—Miss K. K. The *x*-ray shows most of her stomach in the pelvis, even in the prone posture.

good men, both of whom we know and respect highly. The diagnosis of an enteroptosis was not hard. This was confirmed by *x*-ray pictures, which are herewith presented. The patient was not encouraged much about any great success by an operation. After forced feeding and exercises to expand the lower chest, she left the hospital after several weeks of treatment, no better. She returned and begged for operation on April 16, 1926. A long incision was made through the right rectus muscle,

showing extensive adhesions of the ascending and descending colon. These were easily separated. Most of her stomach was down in the pelvis. The gastric hepatic omentum was thinned out to the thickness of thin tissue paper. This was shirred up with fine chromic catgut sutures and the transverse colon fastened up above the boarder of the ribs by sutures drawn through

Fig. 533.—Miss K. K. The *x*-ray shows how well the stomach is elevated, even in the erect posture, six weeks after the operation.

the omentum. Before tying these sutures the peritoneum was scraped along the line of sutures. A curet was drawn lightly but thoroughly over the convex surface of the liver and the peritoneal surface of the diaphragm.

The operation was done in the Trendelenburg posture, and it was noted that the raw surfaces of the ascending and transverse colon where the adhesions had been separated were lodged pretty high up. Therefore no suturing was done. The abdomen

was closed in layers. The patient was kept for fourteen days in a bed the foot of which was raised 16 inches. She felt very well, had a good appetite, which she has not had in years, and presented herself for inspection about the first of June very much satisfied with her condition. She has again taken up her work as a stenographer. She has also gained several pounds in weight.

ATROPHIC SPHINCTER OF THE BLADDER IN AN OLD WOMAN. KELLY OPERATION. CURE

MRS. J. H., aged fifty-seven, presented herself on November 10, 1925. For some time she had great difficulty in retaining any urine at all. The slightest exertions would cause her urine to escape. She has had 12 children and 2 abortions. Six years ago she had a Watkins and a perineal operation. These were very successful. Operation on May 10, 1926. It appeared that during the Watkins operation the incision had been carried over the neck of the bladder and probably cut some of the fibers of the already weak sphincter. The incision was made directly along this scar. The mucous membrane was dissected well back, great care being exercised to lift up the membrane of the vagina only. A soft rubber retention catheter had been introduced into the bladder, and it was shown that only a very thin layer of the mucous membrane of the urethra remained. The sphincter of the bladder was distinctly recognized. This was brought over a gap with three fine chromic catgut mattress-sutures. She was discharged in ten days; she returned in three weeks for inspection, and reported herself, on June 14, 1926, as entirely well and having full control of her bladder.

The operation as advised by Kelly for atrophy of the neck of the bladder is not done often enough. Old women rarely complain of this inability to retain the urine because they have become accustomed to the weakness. They are told that it is an old woman's weakness and must be born. However, many cases can be thoroughly cured and not a few much improved.

Mrs. A. A. presented herself on March 29, 1926. She was twenty-seven years old, married six years, had 2 children, last c ild four years ago, normal birth. Menstruation was normal. Three years ago she began with what she calls a nervous breakdown, for which she had been in the care of a neurologist for nearly three years. She complained of much gas, which will not come

up and which was worse after eating. She had heaviness in the epigastrium on and off and at odd times. At times she eats well and then has no appetite at all. There is soreness about the umbilicus. Since her last child she is much constipated. The roentgenologist reports a constriction of the appendix and a spastic condition of the hepatic flexure. The pathologist reports normal blood and urine. The physical examination is entirely negative, except that the very large caput coli gurgles loudly on pressure.

Fig. 534.—Mrs. A. A. The large caput coli does not show in this *x*-ray picture. A strictured appendix is apparent, but on removal no stricture could be demonstrated.

On March 10, 1926 she was operated on. There had been much reliance placed on the stricture of the appendix as shown by an *x*-ray picture. The large caput coli was not shown by an *x*-ray picture, or at least was not reported by the roentgenologist. A long right rectus incision shows a large number of adhesions holding down the hepatic flexure, while the caput coli and ascending colon are much dilated. The appendix was removed, the adhesions were cut by very shallow incisions, the caput coli shirred up for about 7 cm., and the anterior white line fastened

with five fine chromic size catgut sutures to the posterior shelf of the abdomen.[1]

Her convalescence was disturbed by a slight infection at the lower part of the wound. The appendix was filled with alcohol and hardened in alcohol to study the stricture which is apparent in the *x*-ray picture. There was not the slighest stricture or abnormality of any kind in the appendix. At the present time she is very much improved, but not entirely well.

Cases like the foregoing are comparatively simple.

The next case, Mrs. D. B., aged thirty-six, married fifteen years, shows an exceedingly complicated condition. Seventeen years previous she had an acute appendicitis for which she was operated on. She has had 2 children. The first was a dry labor and forceps. Menstruation was quite regular, moderate amount, but she had a large amount of leukorrhea. She had pain in the epigastrium and nausea in attacks. Cathartics made her worse. She had pain in both iliacs and much gas trouble and belching and was unable to be on her feet for a length of time. On examination it was found that the caput coli feels very full, but is easily emptied by massage. She has a large rectocele and cystocele. The cervix is lacerated deeply into the left side and into the broad ligament. An *x*-ray showed a full appendix, but also shows an empty caput coli. The diagnosis before the operation was retroflexed uterus, laceration of the cervix and perineum, rectocele, cystocele, and chronic appendicitis, to which was added after the operation pericolitis and dilatation of the colon. The operation was done on April 14, 1926. The cervix was dilated and the uterus curetted. The cervix was amputated. A Watkins operation was performed. Both tubes were excised at the horn of the uterus and the wound sewed over with fine linen thread and the perineum repaired. An abdominal section through the right rectus was made. An adherent appendix was removed. The colon was found to contain much fecal matter and gas, in spite of the fact that she has had a thorough cathartic on the day previous, and enemas. The

[1] Good work in this line has been seen in the work of Bainbridge in New York.

pericolic adhesions were cut with very shallow incisions and pushed back into the abdomen, and the caput coli was reduced in size by shirring it up with two linen thread sutures taken along the white line for about 7 cm. She reported herself very well two months later.

CLINIC OF DR. PAUL M. MECRAY

COOPER HOSPITAL, CAMDEN, N. J.

AN OPERATIVE METHOD OF TREATING HERNIA IN INFANTS

THE first case I have chosen for operation is a baby eight months old who has a hernia. I have selected this patient because I propose to treat it in a rather unusual way. We have been taught that hernia in a baby can usually be cured by the faithful use of a truss, and we know from experience that it is apparently true; I say apparently, for the reason that after wearing a truss for a time the rupture ceases to come down, but the sac remains. So long as a sac exists there is a potential hernia, for, after all, the sac is really the important part of a rupture. This feature has recently been stressed by Dr. R. H. Russell, of Melbourne, Australia, who thinks, and not without reason, that the high removal of the sac is all that is necessary to cure many inguinal herniæ, and his method of operation in the adult is just what we have been doing in the baby.

Years ago Ochsner made the same claim for femoral hernia, advising that the sac be ligated high up, the canal cleared of fat, and no sutures be used to close the canal. He says emphatically that any suture, looking to the obliteration of the femoral canal, does more harm than good. His theory was that a mucous or a serous membrane was necessary to keep any ring in the human body open, and the most certain method of closing the femoral ring was to remove the serous membrane or hernial sac to a point within the abdominal cavity, and thus permit the ring to close spontaneously.

He also had a plan of curing herniæ in infants by posture. The foot of the crib was raised so that the intestines gravitated

toward the diaphragm. This position was maintained for a couple of months, with the result that the canal not only closed, but the mesentery became shorter. This is possibly the best non-operative plan we have.

Anyone who has had an opportunity to examine many persons for herniæ knows that it is a common occurrence for an individual to wear a truss a number of years, then lay it aside for a time, under the impression that the rupture is cured, only to have a recurrence. It is equally true that there are more recurrences after radical operations in adults than most operators claim. This has been frequently brought to my attention in making physical examinations of the employees of a large industrial corporation.

If these things be true, isn't it better to cure the rupture in the baby now than to wait for the seventh year as is usually taught? I got this idea in Mr. Andrew Fullerton's Clinic at the Queens University, Belfast. He claims that the operation is no more serious than a tonsillectomy. Indeed, he speaks of it as an out-patiént procedure, so that when the hospital is full the children can be taken home by the mother as soon as they are out of the anesthetic.

The operation itself is a little more difficult than in the older patient because of the smallness and thinness of the tissues, but it presents no unusual features. The usual incision is made, the neck of the sac is isolated, traction is then made on the sac, and the neck is ligated high up with No. 1 chromic gut. The sac is then cut off distal to the ligature and usually allowed to remain undisturbed. If it can be easily removed there is no objection to taking it out, but it does not appear to do any harm, and so far as I know hydrocele never follows the failure to remove. No sutures are placed in the deeper structures, the skin is closed with a few fine sutures, and a gauze pad is placed over the wound and held with adhesive plaster. This is allowed to remain until all oozing has ceased. After waiting at least half an hour to be quite sure the wound is entirely dry, the part is wiped off with ether, and a gauze and collodion dressing applied.

In the operation one should bear in mind the possibility of

undescended testicle or sliding hernia. This brings to mind a procedure for the cure of sliding hernia, which, although I have only had an opportunity to use it once, was quite satisfactory.

The diagnosis was made at the operation, the abdomen was then opened as in an appendix operation, and incision made in the peritoneum to the outer side of the ascending colon from the cecum to the hepatic flexure. The outer leaf of the peritoneum was loosened by the hand and the ascending colon rolled under it, the edge of the peritoneum was then sutured to the anterior longitudinal band of the colon almost up to the hepatic flexure, and finally, to prevent kinking at the flexure, a few of the upper sutures were placed in the outer longitudinal band. This is Wanghl's method; he used it to correct chronic intestinal stasis and some of the other symptoms commonly attributed to Lane's disease.

FRACTURE OF THE SURGICAL NECK OF THE HUMERUS WITH SUBCORACOID DISLOCATION OF THE HEAD

THE next two cases are of interest in so much as they represent a rather unusual injury of the shoulder; a condition which from the appearance of the *x*-ray film one is apt to conclude that an open operation is the only recourse. The fact is, reduction can be obtained in the majority of these cases without much difficulty. It so happens that we have had several of them.

Case I.—This patient is a woman who gave the history of having fallen down a flight of stairs, injuring her right shoulder. This accident occurred three days prior to her entering the hospital. The diagnosis was made elsewhere and open operation advised.

An examination showed that she was markedly contused over the right shoulder and that there was considerable depression under the right acromion process with a palpable mass below the coracoid process. This proved to be the humeral head, as could be seen by the *x*-ray. There was considerable crepitation and abnormal mobility in the right shoulder and upper arm.

She was placed in bed with weight extension to tire the muscles, later gas and ether anesthesia was administered to obtain complete relaxation. The arm was then placed in right angular abduction and manual extension applied. Careful thumb pressure on the humeral head was made, and without a great deal of difficulty the head was readjusted in the original position in the glenoid cavity. She was placed in a Balkan frame and extension applied to forearm and arm, thus bringing the fracture in satisfactory alignment.

The final result in this case is entirely satisfactory and the patient has normal use of her shoulder. The *x*-ray shows the head in its normal position and the fracture in rather good alignment.

Case II.—A male adult who gave the history of having fallen from a signal tower on November 19, 1924. He was admitted to a local hospital and treated until November 26, 1924. Then he was referred to this hospital, with a request that an open operation be performed. This was on the advice of an orthopedic surgeon, who had been called from a distance in consultation.

When he was admitted here examination showed considerable deformity of the left shoulder with marked ecchymosis and crep-

Fig. 535.—Case II. Shoulder in cast. Dislocation reduced. Head in proper relation to glenoid. Fragments in satisfactory alignments.

itus of the upper end of the left humerus. He had numerous *x*-rays which revealed a comminuted fracture of the surgical neck of the left humerus with shortening of one inch, and the humeral head was dislocated into a position below the coracoid process.

The arm was placed in a Balkan frame and extension applied by weights, the arm being held at right angular abduction until the muscles were relaxed. Again in this case gas and ether were

given to a point of full relaxation. The humeral head was then manipulated into its proper position by thumb pressure, care being taken to avoid injury to the soft parts.

The patient remained in the hospital twenty-eight days. The *x*-ray shows the deformity before the reduction and after

Fig. 536.—Fracture of surgical neck. Dislocation of humeral head. Taken at time of admission, one week after accident.

the treatment. The reduction of the fracture is almost complete, really better than we expected to get. The follow-up examination made some months after the patient left the hospital shows that he has an almost perfect end-result; indeed, he says that he is able to do overhead wiring without inconvenience.

It is my belief that this process of extension with thumb pressure on the humeral head should always be attempted before operation is considered because reduction can often be accomplished without great difficulty. It obviates the danger of an open operation, and the end-results most certainly show an increase of function over the open method.

EPITHELIOMA OF THE ANUS IN A CASE OF IMPERFORATE RECTUM

THE next case is very interesting and is, I think, quite unusual. The patient is an unmarried woman, thirty-five years old, who presents herself to the Cooper Hospital Clinic complaining of a painful tumor of the anus. She dates her present trouble to two months ago when she first noticed a mass adjacent to the anus, which has grown very gradually, and during the past two weeks she has been soiling a napkin a day with a bloody discharge. The tumor has become somewhat tender and painful during this time.

Her family history is negative. There is no consanguinity nor history of any congenital malformations in the family. She was born with an imperforate rectum. Both the rectum and the proctodeum are developed, but have not united, the septum being about two inches above the anus. No other malformations were noted.

When she was three days old an unsuccessful attempt was made here in this hospital to establish an opening between the rectum and the anus, and on the seventh day after birth a left inguinal colostomy was made, which proved very satisfactory throughout her life, and gave her no discomfort except during an attack of diarrhea.

She is a fairly well-developed woman, although somewhat anemic, and with a scoliosis which requires the wearing of a spinal brace. On examination there is an indurated tumor, tender and ulcerating, about the size of an almond. This mass is situated at the border of the proctodeum and extends upward and outward along the anal canal about 2.5 cm., and appears to be invading the perianal tissue. There is at present a bloody exudate on the ulcerating surface.

After due consideration it was decided to remove this mass, which was also to be used for a biopsy.

Operation.—Under nitrous oxid and oxygen anesthesia a tumor about the size of a horse chestnut was excised along the border of the proctodeum. It is an indurated and ulcerated tumor and seems to be incapsulated. It occupies the right side of the perineum, extending upward to the under surface of the levator ani muscle, which is very poorly developed.

No attempt was made to re-establish the continuity of the bowel, and the space from which the tumor was removed was packed with iodoform gauze. There was good operative recovery.

Pathologist's Report.—Diagnosis: Epithelioma of the anus—Gross. The specimen is an irregular tumor, rather firm in consistency. The cut surface is grayish white, its diameter is approximately 3 cm. Microscopically, the tumor is unquestionably an epithelioma, showing lawless growth and infiltration of the epithelial cells of squamous origin.

This case seems to me to be very interesting due to the fact that an epithelioma has established itself in a rectum which has not functioned for thirty-five years. This seems to eliminate the theory of continuous irritation as a causal factor in the growth.

Another unusual feature worthy of note is that her history shows so little discomfort with her colostomy.

CLINIC OF DR. THOMAS B. LEE

COOPER HOSPITAL, CAMDEN, N. J.

CHRONIC METRITIS

UNDER the term "chronic metritis" are grouped a number of uterine conditions which present somewhat similar symptoms and to a certain extent similar pathologic changes, especially in their later stages.

The literature on the subject while moderately abundant does not completely clarify the matter, but submits a mass of information from which we learn that fibrous tissue, hyaline changes, infiltration of plasma cells, round-cell infiltration, endarteritis, and an increase in the elastic tissue exists in various stages and degrees.

The causes assigned are infections through the endometrium, accidents during labor, abortions, subinvolution, the natural changes due to the approaching menopause, adnexal disease, syphilis, arteriosclerosis, etc.

There appears to be no one set of clinical symptoms accompanied by constant pathologic findings which is entitled to be named "chronic metritis," the exception being possibly, according to Goodall, that an increase of elastic tissue is a characteristic of true subinvolution.

During the last few years our attention has been directed to a group of cases which we believe to constitute a rather definite clinical entity with well-established history and definite therapeutic indications.

Our first case is typical of this group, so we will present the pertinent portions of her history, symptoms, and physical findings.

Mrs. A. W., aged thirty; married three years; sterile; com-

plaints: a very severe dysmenorrhea, lasting three or four days, menorrhagia about every third month, dyspareunia, leukorrhea, and general invalidism.

She began menstruating at fourteen without pain, and continued to do so normally until about her eighteenth year, when pain at periods began to manifest themselves and have gradually increased in severity until at present she is in bed for practically three days in spite of the use of sedatives. The menorrhagia has been irregular in its occurrence and has appeared approximately every three months. The hemoglobin is 80 per cent. Otherwise the blood appears to be negative. The blood Wassermann is also negative. The leukorrhea has persisted ever since she can remember, although it has varied in amount from time to time.

We believe this to be a most important factor in her disease. The general physical examination is negative. She is plump and her appetite is good. She sleeps poorly and is nervous, her nervous system having been irritated and exhausted by the deadly certainty with which her pains periodically recur. Vaginal examaintion: Vagina normal, cervix hypertrophied, otherwise apparently negative, the uterus is smaller than normal, globular in contour, very hard, and excruciatingly sensitive. Two years ago her appendix was removed and her uterus was dilated, curetted, and suspended. She was not benefited by these procedures.

We have carefully studied over 100 such cases in the last three years and have scrupulously excluded from the study all cases which were complicated by adnexal disease, with the following findings:

Leukorrhea.—A definite history of leukorrhea was present in 98 of the 100 cases. In over 50 of the cases it antedated marriage and in 25 it began at or before the establishment of the menstrual function. Since leukorrhea is almost synonymous with infections of the cervical glands, and since it is so constantly present in damaged and poorly functioning uteri, it would seem that cervical infections must have some etiologic significance in the diseased uterus. That infection in the cervix has been a

"focus" of symptoms remote from the pelvis has not been our experience. On the other hand, it has appeared to be the portal through which many pelvic infections occur.

Dysmenorrhea has been a constant finding in the 100 cases. It has usually appeared a few years after the appearance of the leukorrhea. Ninety cases began menstruating without pain. Of the remaining 10, 8 admitted having leukorrhea in childhood. Dysmenorrhea appearing after years of normal menstruating and in the absence of constitutional or adnexal disease is always significant of uterine trouble.

Age.—Fifty-six patients were between thirty and forty years. The youngest was twenty-one, the oldest fifty-one. The age of the patient has had apparently little to do with the extent of the damage found in the uterus. On the other hand, in those patients in whom the symptoms had existed longest we found the most extensive changes in the uterus. Our youngest patient (twenty-one), in whom the symptoms had existed since puberty and who claimed to have had a leukorrhea since infancy, had a uterus which was converted into a small hyalin ball.

Syphilis.—The Wassermann reaction was positive in only 1 case.

Menorrhagia.—Much to our surprise, excessive bleeding was not a prominent feature, occurring in only 18 cases. A larger percentage ($33\frac{1}{3}$) claimed oligomenorrhea.

Sterility.—Thirty per cent. of our series were sterile.

Endocervicitis.—All cases exhibited evidence of cervical infection. Erosions were most common. In many of the nonparous cases a curious distortion of the external os was seen, almost like in appearance a slight birth laceration.

Pelvic Examination.—As has been said, all cases were excluded from the series in which adnexal disease could be palpated or was found at operation. The uterus is always very sensitive, much more so than the adnexa, which in many patients is the reverse of normal conditions. In the long-standing cases uterus is normal in size or smaller than normal and is very hard (85 per cent.). In the remaining 15 per cent. the uterus was found to be larger than normal. Twenty per cent. were retroverted.

Morbid Anatomy.—The morbid anatomy is very interesting and constant. When the symptoms have persisted only a few years (three to five) the uterus is found increased in size and of somewhat flabby consistency, its color is lighter, and over the fundus are found definite whitish areas which are characteristic. These are from 5 to 10 mm. in diameter and give the uterus a mottled appearance. They may be differentiated from the mottling of uterine congestion found in the retroverted uterus by holding the organ up in its normal position for a few minutes, when the congestion will disappear. The cut surface is streaky in appearance. In the older cases the uterus is definitely harder and smaller than normal and cuts with great difficulty. The cut surfaces glisten and the cut vessels protrude. The peritoneal capsule shows very little change. The endometrium is often somewhat thickened in the earlier cases and thin and sketchy in the small hard uteri.

Pathologic Histology.—I have asked Doctor David L. Farley, director of the Hospital Laboratories, to present the histologic picture found.

Dr. Farley: Histologically three features were prominent—fibrosis, hyalin degeneration, and arteritis. The fibrosis varied in extent and degree from a slight increase around the blood-vessels to practical replacement of muscle tissue by fibrous tissue. In some cases the fibrosis appeared to be old, with small, scanty nuclei. In others fibroblastic activity was prominent, the process evidently progressing. Hyalin degeneration was present in every case except one. The blood-vessel walls and the areas of fibrosis were usually the site of hyaline changes. Hyaline changes were especially prominent in 3 patients whose ages were twenty-one, twenty-six, and thirty-one years.

Lesions of the blood-vessels were present in practically all of the cases. These lesions were endarteritis and mesarteritis with thickening of the coats and in some cases obliteration.

Large perivascular and focal collections of leukocytes, such as occur in chronic metritis secondary to chronic pelvic peritonitis, were not prominent, but some apparent increase in lymphocytes, especially in the perivascular areas, was noted in 5 cases. A

decision as to whether there was such an increase was sometimes difficult because of the presence of a certain number of lymphocytes normally within the uterine muscle. In over one-half of the cases a considerable number of plasma cells were seen. Eosinophils, both of the mononuclear type and the polynuclear type, were present in one-third of the cases. Focal collections of pus-cells were not present in any case. An occasional polymorphonuclear cell was noted in one-half the cases. Too much significance cannot be attached, however, to an occasional polymorphonuclear cell found in the interstitial tissue.

From the histologic picture the cases might be divided roughly into two groups: those showing sclerosis of blood-vessels with degenerative changes in the vessel walls and interstitial fibrosis, and a second group showing all the features of the first group plus perivascular collections of round-cells. The diagnosis of uterine sclerosis seems a better term for the first group than chronic metritis, reserving the latter term for those cases which show both focal collections of leukocytes and degenerative changes.

DR. LEE: We personally believe that the two groups of which Dr. Farley speaks are different stages of the same disease. The group termed "uterine sclerosis" being simply a later stage of the earlier manifestations which he calls chronic metritis. It will also be noted that advanced hyaline changes were found in the patient as young as twenty-one and in another patient at thirty-nine, which agrees with the clinical findings that the age of the patient makes little difference and that the degree of damage is proportionate to the age of the disease.

Treatment.—The treatment is exclusively surgical. Local treatments of all kinds are fruitless. Heat and the various applications of electrical energy have been tried and, though giving temporary relief, have been abandoned for good reasons.

Radium has been useful in our hands only in controlling excessive hemorrhage, but has caused no abatement of the distress and causes needless injury to the ovaries, a sad accident in the younger patients. The ideal surgical intravention would be that which would remove only the diseased portions of the

uterus leaving all the healthy tissue possible—obviously a very difficult task for the unaided eye. We have, therefore, routinely confined ourselves to a fundectomy in the less advanced cases, hoping thereby to retain at least a portion of the menstrual function. When the uterus was converted into a small hard fibrous sphere a supravaginal hysterectomy was done. It has seemed better to us not to do a panhysterectomy for several reasons. First, less morbidity and slightly less mortality. Second, the great majority of our cases are in that time of life at which more or less sexual activity is usual, and it has been our misfortune to have had considerable complaint of dyspareunia following total removal of the uterus. Third, the cervix can be in most cases adequately cared for without its removal.

Fundectomy.—In the fundectomy slightly more than the fundus is removed. A Kelly hemostat is placed on the uterus at either cornua, the tip of the clamp stopping at the edge of the round ligament. In adjusting these clamps an attempt is made to save as much as possible of the utero-ovarian anastomosis, in the manner suggested by Pollak. This we believe assists very materially in preserving the adnexal circulation. The adnexa are now severed from the uterus $\frac{3}{8}$ inch proximal to the clamps, leaving a small amount of cornual tissue. The fundus is now removed by cutting from the tip of one clamp to that of the opposite side, removing a somewhat wedge-shaped piece of tissue, so that the flaps of the remaining uterus are beveled gently toward the endometrium. The clamps are now removed one at a time and a No. 2 catgut ligature adjusted in each clamp groove. Chromic gut is used, tied in flat knots, giving each knot a double twist in order to prevent slipping. Catgut ligatures rarely ever break after tying, but not infrequently slip and untie. The second twist insures against this embarrassing accident. We have tried in a few cases to dissect out and leave a healthy looking endometrium when a portion of the corpus has had to be removed, but have seen no benefit from this procedure. The pedicles to which the adnexa are attached are now turned downward against the raw uterine tissue and the beveled anterior and posterior uterine edges are sewed over

them, affecting a neat peritonization. If the uterine stump is low in the pelvis the round ligaments are sewed together on top of the remaining portion of the uterus, which completes the covering in of all cut edges.

The cervix is treated by the cautery in non-parous cases and by a modification of the Sturmdorf operation when lacerations exist.

Results.—Fundectomy. Seventy-five per cent. have been completely relieved of symptoms for which treatment was undertaken. Of the remaining 25 per cent. a marked amelioration of symptoms was obtained except in 2 cases, who still have severe pain at menses. Two in this latter group have had several attacks of profuse bleeding. It is interesting to note that these cases did not have menorrhagia prior to operation.

Subtotal hysterectomy: The results in subtotal hysterectomy were uniformly satisfactory, as would be expected.

Leukorrhea: In about 5 per cent. of the cases the leukorrhea has persisted sufficiently to cause the patient to seek treatment.

SUMMARY

One hundred cases were studied to which the following conditions were common:

1. Leukorrhea of years' duration.
2. Dysmenorrhea (disabling) of years' duration.
3. Evidence of chronic infection of the glands of the uterine cervix.
4. Replacement of normal muscle tissue in the uterus by fibrous and hyaline tissue.

CONCLUSIONS

1. Leukorrhea of years' standing is the result of chronic infection of the uterine cervical glands.
2. Chronic infections of the cervix of years' duration results in definite and permanent changes in the uterine tissue.

CLINIC OF DR. DONALD MINER

CHRIST HOSPITAL, JERSEY CITY, N. J.

JEJUNOSTOMY

IN the handling of desperate risk abdominal cases the use of jejunostomy alone or with some other procedure will grow rapidly, and with good reason.

It is probable that few cases of intestinal obstruction should be operated upon without doing a jejunostomy. It often cannot be known just how long a given obstruction has existed, with a consequent loading up of the lumen of the gut with toxic material. Patients may go on for days with a partial obstruction and little or no complaints. Simple relief of the complete obstruction when vomiting does occur is often not sufficient to save life. The intestinal contents must be evacuated, and to trust to peristalsis from a distended atonic intestinal musculature is futile.

It not infrequently happens that jejunostomy should precede by a number of hours or days the release of the obstruction or resection of gangrenous intestine, as the case may be.

When obstruction cases come to the surgeon late, drainage of the bowel above the obstruction is imperative. The patient's condition will improve, with such drainage and restoration of the blood chlorids, to an almost unbelievable degree, permitting the perhaps difficult and lengthy restoration of intestinal continuity when in an operable condition.

In peritonitis we have a similar condition in that most cases of diffuse peritonitis have a more or less complete obstruction of the atonic paralytic type, if not mechanical, from agglutination of coils and adhesions.

In the very toxic cases lavage through the jejunostomy tube of hot saline, frequently repeated, is of the greatest value when they do not drain well. Profuse drainage usually repays one.

Before the tube is withdrawn and after the cause of obstruction is corrected, in both intestinal obstruction and peritonitis, it is well to clamp the tube a number of times a day and for a lengthening period, until, before removal of the tube, the clamp has been on continuously for a day or two.

The use of jejunostomy in gastric surgery is not new, but has not been as greatly utilized as its merit would seem to justify.

Cases illustrating each of the above indications are reported here from the work of the current year.

JEJUNOSTOMY IN INTESTINAL OBSTRUCTION. A CASE OF RECURRENT OBSTRUCTION CAUSED BY GALL-STONES

The Witzel technic with the tube drawn through the omentum, more readily admits of reopening the abdomen at the site of a previous incision than the purse-string and ventral fixation technic.

In this case obstruction recurred four days later and there was no difficulty or danger in bringing into the field the previous jejunostomy, opening the gut at the same site and removing a second large obstructing gall-stone.

Case report: L. R., married female; fifty.

Past history negative. No history of gas belching, vomiting, jaundice, shoulder or scapular pain, or epigastric distress.

Present Illness.—On March 1, 1926 the patient had vague abdominal distress with nausea and later in the day vomited. There was no pain and she continued about her housework.

During the following two days the distress became greater and though she fasted, the vomiting increased, becoming stercoraceous. The patient was seen in consultation at her home with Dr. Miles Long on the night of the third day, at which time her abdomen was moderately distended, with a point of slight rigidity and tenderness 2 inches to the left of and below the navel. She was taken to the hospital and operated upon. Operation in Christ Hospital, March 4, 1926.

Local anesthesia, 1 per cent. procain infiltration. Incision about 4 inches long just to the left of the navel, with navel opposite its center.

Greatly distended small gut protruded. The patient was partly eviscerated in finding a hard round mass obstructing the lumen of the lower jejunum, below the lower end of the incision. With clamps on gut this was removed and proved to be a gallstone over 1 inch in diameter. A zero catgut purse-string suture was then placed and electric suction tip introduced, tying only half-knot, ends being held by first assistant. Upper gut clamp was then removed and the distended small gut emptied of its contents. As the aspirator was withdrawn the intestinal clamp was reapplied and a No. 18 French catheter was introduced. The round tip of the catheter had been cut off and two fenestra had been made in its sides. The purse-string then was tied and the Witzel technic completed with Lembert sutures burying the catheter for 2 inches in the wall of the intestine. The catherer was passed through the omentum and wound closed in layers.

Hot, copious, gastric lavage was given. Intravenous injection of normal saline, and eight hours later hypodermoclysis of normal saline to replenish the depleted blood chlorids.

The jejunostomy drainage was profuse, and after twenty-four hours water, gruel, and consommé were allowed by mouth. Improvement was continuous, with bowel movements and no vomiting, until the night of March 7th, when the drainage ceased and toward morning the patient vomited about 8 ounces of material with fecal odor. Early on the morning of March 8th the patient was reopened.

Second operation: The previously made wound was opened and the jejunostomy was delivered. A second large stone was removed about the size of the former, 2 inches above the previous location of the first stone. The jejunostomy tube was reinserted. Search for further stones was made, but none were found.

The gall-bladder was not made out due to massive adhesions in that area. Obviously no attempt was made to break up these adhesions, as it was inferred that these stones had ulcer-

ated through the fundus into the duodenum or upper jejunum. Gastric lavage was given immediately postoperative.

The patient's convalescence was steady and she went home apparently well twenty-eight days after her second operation.

JEJUNOSTOMY IN PERITONITIS

On June 3, 1926 a colored woman of fifty-five years was seen, having been referred by Dr. H. Hoops for moderate sized fibromyomata uteri.

Past History.—Operation for fistula in ano in 1921. Always moderately constipated. Subject to migraine and neuralgia.

Present Illness.—Menstruation regular up to November, 1925. It was of the four-day and scant type. No menstruation from November to April, 1926, when a very profuse flow occurred lasting eight days. Recurred in May, also profuse.

Examination.—Poorly nourished colored woman. Fibromyomata almost to the navel, freely movable. Cervical inspection revealed a badly infected eroded cervix, otherwise negative.

Operation, June 12, 1926, in Christ Hospital.

Total Hysterectomy.—After anesthesia was induced the vagina was generously swabbed with 2 per cent. mercurochrome solution. The orthodox total hysterectomy technic was employed, removing with the uterus ½-inch cuff of vagina. The vaginal vault was closed excepting a small opening in the center, in which was placed a roll of rubber-dam to drain the cul-desac.

The postoperative course was stormy, marked by a rise in pulse and temperature to 128° and 102° F. respectively on the third day. Vaginal drainage of foul slimy pus was profuse. Culture showed non-hemolytic streptococci.

On the seventh day, June 19th, jejunostomy was done. White blood-count on that date was 23,600, polymorphonuclears 92 per cent. Up to this time the patient had vomited almost continuously in spite of repeated lavage. Rectal drip was not retained. Fluids had been maintained by repeated hypodermoclysis of normal saline.

The usual Witzel technic heretofore described was employed

under local anesthesia. There was every evidence of a diffuse peritonitis. All serosa visualized was covered with a plastic exudate and pus.

The small gut was greatly distended. The jejunostomy tube was left unclamped for forty-eight, hours when it was estimated that toxic material was largely evacuated, 50 ounces having been drained. Intermittent feedings and drainage were then instituted. Using 10 per cent. glucose, at first 3, then 6 ounces were slowly introduced through a funnel and the tube clamped for two hours. Drainage was then allowed for one hour and the feeding repeated.

With the institution of drainage vomiting ceased. On the fourth day after jejunostomy broth and gruel feedings were started. The improvement was definite, though slow, and on June 30th the jejunostomy tube was withdrawn. No leakage followed withdrawal of the tube.

The patient left the hospital on the twenty-first day after the jejunostomy and twenty-eighth day after total hysterectomy.

In this case it is highly probable that no other procedure could have prevented death from peritonitis which followed a total hysterectomy, undoubtedly from vaginal contamination.

Dr. Manheim's pathologic report of the specimen removed was fibromyomata uteri.

JEJUNOSTOMY IN GASTRIC SURGERY

Two cases of gastric resection in which jejunostomy was performed are reported.

The use of this simple method of placing the stomach at rest for two, three or four days, as condition may demand, after any type of gastric surgery is deserving of attention. Body fluids are maintained and sufficient calories may be introduced to be a factor for safety, especially in those cases that have come to operation in a toxic emaciated condition.

Suture lines are rarely cause for concern, but for some hours after stomach operations and sometimes for two or three days there is atony of the remaining stomach. In such cases liquids taken by mouth remain in the stomach until partially vomited

and, as the residue increases, the patient often takes on many of the characteristics of a case of high obstruction.

The use of the jejunostomy tube precludes to a great extent the possible complications.

Case I.—A. K., male fifty-six years old, watchman, born in Germany. First seen June 3, 1926, bringing with him an *x*-ray report of Dr. Harry Perlberg's, which stated that he had an obstructing pyloric lesion with a 30 per cent. gastric residue after six hours. Past history was negative.

Present Illness.—Began to have "indigestion" three years ago, *i. e.*, belched gas. About four weeks ago he began to vomit and had lost weight from 157. He had pain after meals until he vomited, which relieved him.

Examination.—Weight 136½ pounds. Very septic teeth. Abdomen flaccid except general resistance to palpation in upper abdomen. Enlarged inguinal lymph-nodes. Blood-pressure was 120/78.

Gastric Analysis.—No free HCl, no blood, no bacilli. Urine was negative. Blood-count, reds 4,520,000, whites 4500, hemoglobin 80 per cent. He was given daily gastric lavage, careful mouth hygiene, glucose drip, and small frequent feedings by the mouth. Six days after admission he was operated upon. Operation in Christ Hospital June 14, 1926.

General Anesthesia.—Incision left of midline above navel, rectus retracted. A lesion was found about 2 inches long and 1 inch wide in midantrum, long axis being same as axis of antrum. There was no crater and the stomach was markedly constricted at the point of the lesion. The liver was uninvolved and exploratory was negative. The gastrohepatic omentum was opened, cutting between ties, then the gastrocolic omentum, carrying the isolation of the stomach well up each curvature and about 1½ inches below the pyloric vein. The duodenum was crushed with Payr's clamp and ligated with heavy linen at the point of crushing after removal of the clamp. The clamp was then reapplied proximal to the ligated duodenum, and the duodenum severed with the electrocautery. Two successive linen

purse-string sutures inverting the duodenal stump were then placed, the second including the pancreas, so that the stump was head on into the pancreas.

A loop of jejunum, close to the ligament of Treitz, was then brought through an opening made close to the spine in the transverse mesocolon. This was anastomosed with the stomach so that there was no sag in the loop. The serous suture of double zero was placed before the stomach was severed with electrocautery about 3 inches above the lesion. The inner suture was then placed, using anteriorly the "loop on the mucosa," so that the gut and stomach mucosa were inverted, the proximal jejunum being anastomosed to the lesser curvature. The opening in the mesocolon was sewn by interrupted catgut zero sutures to the stomach above the anastomosis. The colon was tacked up to pancreas and duodenal stump, using tags of gastrocolic omentum. A loop of gut in midabdomen, about opposite the cecum, was then brought up and small straight rubber-covered clamps applied, emptying the gut of gas before the second clamp was placed. A small nick in the serosa was made and a clip pushed through into the gut; a purse-string was then placed, keeping close to opening. A No. 20 French rubber catheter, from which the tip had been cut and lateral fenestra made, was introduced and the purse-string tied, inverting serosa. Catheter was clamped, clamps on gut removed, and catheter covered with gut for 2 inches by Lembert suture similar to a Witzel gastrostomy, being careful not to constrict lumen of gut. The end of the catheter was passed through the omentum which was tacked to the gut. The abdomen was closed, the catheter coming out at the lowest point of the incision.

In closing a silkworm-gut suture was passed tightly four or five times around the catheter after being passed through the skin, and then was passed through the skin on the other side of the incision so that traction could not pull out the tube until the silkworm-gut was removed.

The patient was given 1500 c.c. of normal saline by hypodermoclysis before coming out of ether.

Through the jejunostomy tube eight hours after operation

1 ounce of 5 per cent. glucose was given every hour. The next day 2 ounces of 10 per cent. glucose every two hours and this was continued until the third day, when mouth feedings of albumin water and orange juice were given. The stomach was aspirated on the second and third day, though no vomiting occurred. The tube was removed on the fifth day. The patient was up on the ninth day and home on the twelfth (June 26th). He reported to my office on July 1st weighing 127¼ pounds and asking for more to eat.

Fluoroscopic examination that day showed the small stomach functioning well. His physician has since reported that the patient felt fine and is gaining weight rapidly.

Dr. P. E. Manheim reported the specimen to be adenocarcinoma and that one enlarged gland was found in the gastrohepatic omentum. It showed no evidence of carcinoma.

Grossly, the lumen of the antrum at the site of the lesion would not pass an ordinary lead pencil.

This man's convalescence was made more secure by a method of feeding that did not entail the use of a stomach about three-fifths of which had been removed. Furthermore, if he had developed any abdominal complication, such as peritonitis, he would have been a better risk with a jejunostomy tube *in situ*.

Case II.—Two days ago I did a similar operation for a large (2-inch) clean-cut perforated ulcer of the anterior wall of the stomach, sealed by the liver and ½ inch perforated ulcer of the posterior wall sealed by the pancreas, in a man of fifty-eight.

The technic was the same, excepting that the short loop of jejunum was brought anterior to the colon with the proximal jejunum to the greater curvature, constituting a Moynihan II.

This patient had a ten-year history of food pain with fasting relief. He had been vomiting very foul material for four months and his emaciation was extreme. *x*-Ray by Dr. Perlstein showed a large forty-eight-hour residue. Lavages and mouth hygiene for five days preceding operation.

This morning (September 22, 1926) his pulse was 88 and temperature 99.6° F., all feedings being by jejunostomy tube.

TOXIC GOITER

GREAT credit is due Lahey for his emphasis of the usefulness of surgery in thyrotoxic heart cases. Bed invalids can be restored to a degree of health for which they are appreciative.

Case Report.—Mrs. J. A., age fifty-two, married, seen in consultation May 18, 1926, with Dr. Von Deesten of Hoboken, who had recently been called in.

Past history negative.

Present illness began three and one-half years ago with loss of weight, slight swelling in her neck, and nervousness. Later her feet began to swell and she had heart palpitation. For the past nine months she has been bed-ridden with general anasarca, ascites, and pleural effusions. During this period she received Lugol's solution and digitalis continuously. Novarserol had given no relief on two occasions. Her appetite was voracious. She had been having nine to ten movements daily and had orthopnea.

Examination revealed a thin-faced, alert, elderly appearing woman with extreme edema up to her breasts. There was a No. 2 sized thyroid enlargement, a tachycardia of 140 at the wrist, and Dr. Von Deesten said she had a constant auricular fibrillation. Her metabolism was +50. She was taken to the hospital May 23, 1926. Blood-count, reds 3,204,000, whites 4100, hemoglobin 60 per cent. Urine showed no albumin, specific gravity 1012, no casts. Operation, June 1, 1926, in Christ Hospital.

Local anesthesia: One per cent. procain infiltration. Low collar incision. Anterior muscles both sides cut between clamps. Blunt dissection of gland from its bed and radical removal of all thyroid gland except an area $\frac{1}{4}$ inch thick and $1\frac{1}{2}$ inches across, anterior to each parathyroid. Rubber-dam drainage, usual closure.

Dr. P. F. Manheim's pathologic report: Diffuse adenomatous hyperplasia of thyroid.

Reaction to operation: A pulse that was for a time uncountable, later coming down to 148, and thereafter steadily better. The night of operation temperature was 102° F. On the second day patient was given 1 c.c. novarserol intravenously and again 1.5 c.c. intravenously on the fifth day. On the seventh day, wound being healed, patient was transferred to Dr. Von Deesten's service.

The relation of intake to output of fluids follows: Days after operation:

	Intake, ounces.	Output, ounces.
1	60	43
2	35	20
3	23	26
4	27	72
5	26	94
6	28	101
7	34	144
12	26	65
15	19	31

From the fifteenth to the twenty-seventh day, when she was discharged, her pulse ran between 80 and 90 and only a slight leg edema below the knee remained of her anasarca.

Dr. Von Deesten reports that she still fibrillates, but that she is about and does the cooking for herself and husband.

EARLY CASE OF EXOPHTHALMIC GOITER

THE reason for reporting this case is because it is unique in that it was seen and operated so early in its course.

This case was seen three weeks after sudden onset. The post-operative course was so smooth and the return to apparently normal health so complete, even though a single-stage operation was done, that it is a lesson in the importance of the element of time in treating exophthalmic goiter cases, and illustrates the preoperative value of iodin.

Case Report.—First seen March 13, 1926. H. M., a female thirty-nine years old, para V, housewife, always had good health. Never had "nerves." Three weeks ago began to notice that her heart was "pounding." Has lost considerable weight, though her appetite is unusually good. Neck has grown larger and she coughs a great deal at night. Hands sweat a good deal and her whole body trembles.

Examination.—Weight 114 pounds, 2 ounces, small diseased tonsils, and considerable dentistry. Pulse 176, No. 3 sized symmetrical goiter, with a thrill and bruit. Blood-pressure 160/80. Basal metabolism proved to be +60. Patient was put to bed on high calorie diet, with an ice-bag over her heart and bromids after each meal. On March 25th Lugol's was added: ♏ x t. i. d., after meals, and on April 5th patient was operated upon. Before operation pulse was ranging between 100 and 128. Operation April 5th, 1926, in Christ Hospital.

Local anesthesia 1 per cent. procain infiltration preceded by two hypodermic injections an hour apart, each containing 1/200 gr. scopolamin, 1/6 gr. morphin sulphate. Low collar incision. Skin and platysma flap dissected up. Anterior thyroid muscles on both sides cut between clamps. Gland dissected from its bed by finger dissection, then cutting between clamps the suspensory ligaments, upper poles and body of the gland on each side removed, leaving a gland $\frac{3}{8}$ inch thick and about 2 inches in

diameter covering each parathyroid; a thin layer of gland was left covering the trachea. Rubber-dam drainage from the gutter lateral to each lobe. Usual closure.

Dr. P. F. Manheim's report on specimen: Hyperplastic goiter.

Reaction to Operation.—Pulse to 140, temperature to 102.6° F., reduced with ice-bags and two hypodermoclyses of 1500 c.c. each of normal saline, eight hours apart.

Patient was up on the fourth day after operation and home on the tenth. Last seen August 30th, when she weighed 132½ pounds with a pulse of 92. She states that she feels perfectly well.

This patient's reaction was very moderate. If she had gone on to a later period undoubtedly a multiple stage operation would have been necessary, and even then her reaction might have been extreme.

PRIMARY KRUNKENBERG CARCINOMA OF THE OVARY

CARCINOMA of the ovary of the Krunkenberg type is rarely primary, is usually bilateral and of considerable size. Metastasis takes place early and the outcome is uniformly fatal. Ewing in an interesting article reports having seen five secondary and one primary carcinoma of this type.

The features of this case are its small size, unilateral location and the possibility of a cure.

Case Report.—C. T., single, age nineteen years, was referred by Dr. D. M. Marks for consideration of what seemed to be

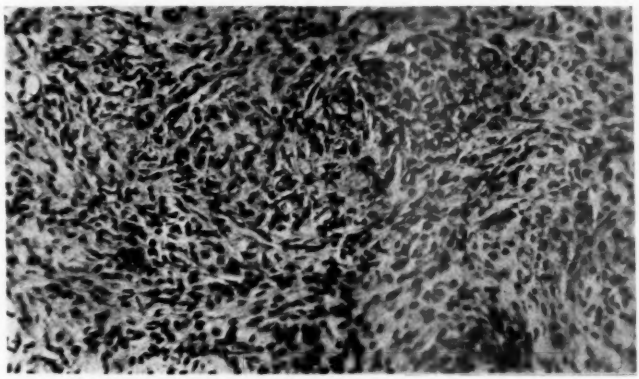


Fig. 537.—Primary Krukenberg carcinoma of the ovary (× 250).

essential uterine bleeding of three months' duration. Because of insidious onset and definite progression of bleeding a diagnostic curettage was contemplated having in mind also a possible carcinoma of the uterus. Under ether a bimanual examination revealed a round, hard, smooth tumor of the left adnexa which was freely movable.

Laparotomy, January 7, 1925, in Christ Hospital, revealed a tumor of the left ovary about 2 inches in diameter which I believed to be a fibroma.

The tumor was removed and the patient made an uneventful convalescence.

She was last seen by me in January, 1926. Nothing abnormal was found by examination and she was without symptoms. Her physician has recently reported that she is in excellent health.

Pathologic Report of Dr. P. F. Manheim on Examination of Ovarian Tumor.—The stroma consists of connective tissue, in some places loose and rather edematous, and in others compact. In the looser areas the stroma is cellular and the individual fibers are fairly constant in size and shape. The cellular areas are scattered irregularly.

The stroma supports numbers of collections of epithelial cells arranged in the form of small alveoli. Some of the individual cells of these groups have granular cytoplasm, while others are decidedly vacuolated and have the typical signet-ring form. Mitotic figures are demonstrable with a fair regularity in both the stroma and the epithelial cells.

The blood-supply consists of thin-walled blood-vessels.

CLINIC OF DRS. MILTON A. SHANGLE AND L. G. BEISLER

ELIZABETH GENERAL HOSPITAL

GASTROJEJUNOCOLIC FISTULA

J. S., white, age thirty-eight, occupation passenger agent.

This young man first consulted us on May 2, 1925, and related the following story:

In September, 1913, while engaged in his usual occupation in another city, he was suddenly seized with sharp, agonizing, epigastric pain accompanied by vomiting and followed by shock.

He was immediately transferred to a hospital and promptly operated upon. The condition then found was a perforated duodenal ulcer and the operative procedure consisted in closure of perforation and gastro-enterostomy.

For nine years following this operation the patient was entirely free from disturbing gastric symptoms and enjoyed excellent health. About three years ago he first noticed some slight epigastric discomfort which would occur at irregular intervals without relation to the ingestion of food.

At no time did he suffer the type of pain or distress suggestive of ulcer.

There was no hematemesis, nor was blood, changed or otherwise, observed in the stools.

Subsequently frequent eructations of gas, with decidedly fecal odor, became most distressing and attacks of irritating diarrhea occurred occasionally.

Recently he has noted that the diarrhea has become more constant and very coarse foods have been observed in the bowel movements within twenty minutes after ingestion.

Vomiting, although not a pronounced feature, has been fecal in character.

The patient now complains, in addition to the symptoms mentioned, that he is growing very weak, and that, in conjunction with recent loss of appetite, there has been a rapid and constant loss in weight.

Examination.—The patient is a man of pale, pasty color, who exhibits evidence of considerable emaciation. Respiratory and cardiovascular systems are apparently normal. The abdomen presents the scar of a previously performed operation. There is some slight distention noticeable in the epigastric

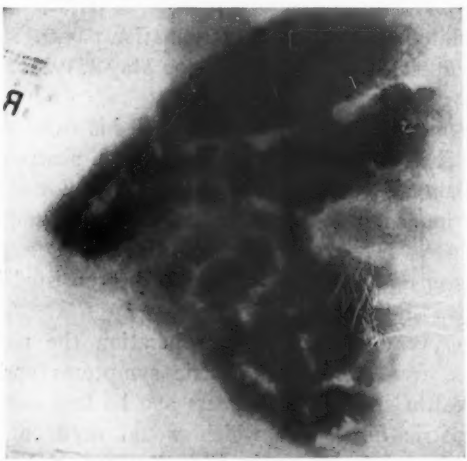


Fig. 538.—Gastrojejunocolic fistula. This radiograph, taken within a few minutes after the ingestion of a barium meal, reveals very strikingly the passage of the meal from the stomach into both the jejunum and transverse colon.

region and pressure over this particular area elicits some tenderness. An indefinite mass is palpable. Blood-pressure is 110 systolic, 80 diastolic.

Hemoglobin 76 per cent., erythrocytes 3,800,000, leukocytes 8400.

Neutrophils 70 per cent. Clotting time six minutes. Bleeding time four minutes.

Wassermann and Kahn are negative.

A tentative diagnosis of fistulous communication between stomach, jejunum, and colon was made and subsequent radiographic studies were corroborative.

Operation (June 11, 1925). Findings as follows:

Liver and omentum densely adherent to old abdominal scar. As the liberated omentum is carried upward, exposing the site of the previously performed gastro-enterostomy, it is noted that

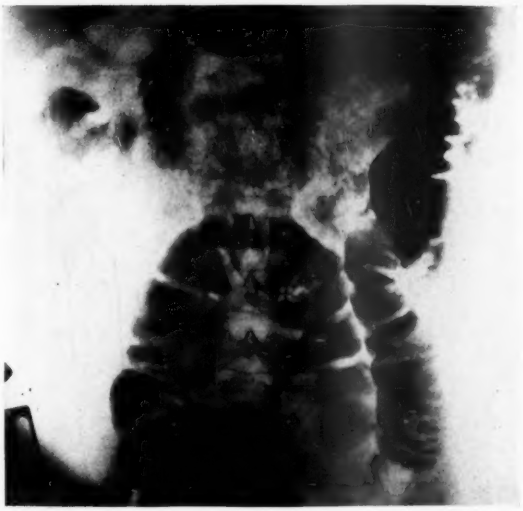


Fig. 539.—Gastrojejunocolic fistula. Following a barium enema, this radiograph shows the column passing upward from the transverse colon into the stomach and jejunum. The early ejection of the barium through the unaltered pylorus is also evident.

the central portion of the transverse colon is firmly incorporated with both posterior gastric wall and jejunum at this point. The stomach is not enlarged to any extent, and the duodenum is negative except for a slight scar situated on the anterior wall of the first portion, marking the site of perforation of old ulcer.

Of especial interest is the marked dilatation of the jejunum extending from the anastomosis downward for possibly 2 feet or more. This portion of gut is practically the size of the colon

and is mottled green in color. As the presenting portion of the anastomosis is exposed and incised it is found that a three-way communication exists between stomach, jejunum, and colon. The fistulous tract is at least 4 cm. in diameter.

Technic.—The exposed wall of the anastomosis is incised, and stomach, jejunum, and colon dissected free each from the other. The wound in the colon is immediately closed in a transverse plane by layer sutures. By means of palpation through the aperture in the posterior gastric wall it is readily determined that the duodenal ulcer has thoroughly healed and that the

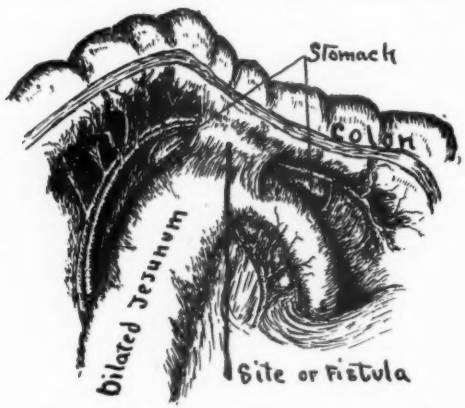


Fig. 540.—This rough sketch illustrates to some extent the condition found after the transverse colon had been rotated upward.

gut is not constricted or distorted in any sense. The posterior stomach wound and the jejunum are then closed in turn by layer sutures, and, as a final step, the rent in the transverse mesocolon is repaired by a continuous linen suture.

Thus, after investigation of the duodenum revealed it to be in such satisfactory condition, the upper gastro-intestinal tract was returned to its normal anatomic state.

The convalescence was entirely smooth and uneventful and the patient was discharged from the hospital on the fifteenth day.

Immediately following operation digestion and assimilation improved, and when reporting on September 25, 1925 he had

gained 30 pounds in weight. On September 14, 1926 the patient reports that he is perfectly well in all respects.

Comment.—Although the development of a gastrojejunal or marginal ulcer is necessarily a precursor to the formation of a complex fistula such as this, yet, in this particular instance, it was impossible to obtain a history which would indicate the existence of such ulcer. Instead the condition developed insidiously and apparently did not produce noticeable symptoms until the estab-

Fig. 541.—Gastrojejunocolic fistula. Radiograph of the stomach, taken about eight months subsequent to operation, shows some indentation of the greater curvature as a sequel to ablation of the fistulous tract. The function is satisfactory, however, the stomach having completely emptied itself at the expiration of the six-hour period.

lishment of fistula had occurred. Firth and others report instances of formation of fistula without symptoms of pre-existing ulcer.

It is also of interest to note that this patient was perfectly well for a matter of nine years following the primary operation. Mayo and Rankin, in a review of cases, state that nine and a

half years is the maximum period which has elapsed between performance of gastro-enterostomy and jejunal ulcer development.

The very extensive dilatation and unusual discoloration of the jejunum were most striking in this case, and, although reference has been made to this associated lesion by Mayo and others, Dr. John Marnoch, of Aberdeen, lays particular stress upon this complication in reporting a case in the British Surgical Journal August, 1921.

He says: "A very noticeable feature was the dilatation of the jejunum for a considerable distance below the site of the anastomosis. It was almost as large as the colon."

The very healthy condition of the duodenum, which permitted restoration of the upper digestive tract to approximately its original state, was a most gratifying discovery to us.

It is generally well known that such procedure is often not feasible, and that, following ablation of the fistulous tract, reestablishment of the stoma, gastroduodenostomy, or even wide gastric and colonic resection are steps which may be necessary to effect a cure of this distressing condition.

RETROPERITONEAL CYST OF UROGENITAL ORIGIN

MRS. C. B. B., white, age thirty-four, married, housewife.

This patient was first seen on June 9, 1925.

She states that she had enjoyed excellent health prior to giving birth to a normal child four years ago. A few months subsequent to this delivery she first became conscious of a swelling in the left upper abdomen. This tumor has gradually but constantly increased in size until the present time. She now complains of a sense of pressure and a dull, aching pain within this portion of the abdomen. Eructation of gas is occasionally noted and the bowel function appears to be somewhat disturbed. At times there has been some tendency to frequent urination, but discoloration of the urine has not been observed. Menstruation is regular and normal in amount and duration. There has been no impairment of appetite and no weight loss.

Examination.—The patient is a young, well-nourished woman who appears to be in good health. Cardiac and respiratory organs are apparently normal. Bimanual and rectal examinations are essentially negative.

Abdomen.—A marked fulness is evident in the left upper quadrant. Palpation reveals a globular tumor in the left lumbar region which is approximately the size of a large grapefruit. It is somewhat mobile and its position is such as to bring it into close relation with the posterior abdominal wall. This tumor is elastic and not particularly tense to the feel, and gives one the impression that it is cystic, rather than solid, in character.

Percussion over the prominent portion of the tumor and over the area extending to the extreme left lateral abdominal wall elicits a flat note, whereas below the inferior pole and to the right the note is tympanitic. This would suggest an inward displacement of the descending colon. Liver and spleen are not palpable. Blood-count is practically normal. Hemoglobin content 86 per cent., clotting time five minutes, bleeding time three and a half minutes.

Repeated urinary analyses show nothing abnormal. The findings in an examination made on the day prior to operation are typical. They are as follows: Color, amber; transparency, cloudy; reaction, acid; gravity, 1018; albumin, none; sugar, none; casts, none; leukocytes, few; epithelium, moderate amount; amorphous sediment, cylindroids. Radiographic examinations prove interesting. That following a barium enema reveals the splenic flexure and upper portion of the descending colon markedly displaced toward the right, and a faint shadow, situated between this displaced gut and the left lateral abdominal wall indicates the site of the tumor.

Fig. 542.—Retroperitoneal cyst.

Pyelographic studies made by our genito-urinary surgeon, Dr. Irving Lerman, depict a complete transposition of the left renal pelvis and upper ureter. Apparently the pelvic portion of the displaced left kidney lies just internal, and slightly inferior, to its fellow of the opposite side. Although both ureters and pelves accept the solution fairly well, the right pelvis appears larger and more distinctly outlined.

Dr. Lerman further reports that the bladder is normal and that the injected indigocarmin dye appears within three minutes in proper concentration, indicating normal renal function.

With this clinical evidence we were undecided as to whether

we had to deal with an unusual cystic condition of the left kidney or with a true retroperitoneal cyst.

Advice for operation was accepted, and it was performed on June 15, 1925.

Description: A posterior curved incision, somewhat more extensive than that necessary in the average renal operation, is employed. As the left retroperitoneal space is exposed a cyst,

Fig. 543.—Retroperitoneal cyst.

approximately the size of a small cocoanut, is encountered. It is monolocular, bluish in color, and is slightly flabby rather than tense.

As dissection advances it is discovered that there is no pedicle and that the cyst has no direct connection with any organ other than by adherent areolar tissue.

As the intact cyst is partially delivered through the incision the left kidney is brought into view, and the removal is completed by division of the areolar tissue interposed between kidney cap-

sule and the cyst wall. The kidney appears to be somewhat smaller than normal in size, but otherwise there is no indication of disease.

The extirpation of this cystic tumor presented no particular technical difficulties, and, although the parietal peritoneum was slightly torn during the removal, the rent was immediately repaired and there were no untoward results. In closing the incision the left kidney, which had been so widely displaced, was suspended approximately in its normal position.

The recovery from operation was satisfactory and the patient was discharged from the hospital on the seventeenth day.

When reporting this month her only complaint is a slight lameness in the left lumbar region.

After removal, the cyst wall appears white and translucent, rather than blue in color, and no vessels are visible. The weight is 4 pounds. When opened the wall is smooth and glistening and fluid contained is a clear serum.

Microscopically, the wall consists of a cellular fibrous tissue lined by a single layer of rather low columnar epithelium.

Remarks: In view of the fact that this cyst was situated external to the descending colon and posterior to the ovarian vessels, had no pedicle, but was adherent to surrounding structures only through the interposition of areolar tissue, was monolocular, bluish in color with no visible vessels, and flabby rather than tense, it corresponds exactly with the vivid description of the true retroperitoneal cysts of urogenital origin as enunciated by R. M. Handfield-Jones in his masterly Hunterian lecture delivered at the Royal College of Surgeons of England on January 23, 1924.

Furthermore, as it was in close relation with a kidney which was rather small in size, it was probably metanephric in origin. These cysts are rather rare and, in the majority of cases, the diagnosis is more difficult than the treatment.

CLINIC OF DR. WILLIAM EDGAR DARNALL

ATLANTIC CITY HOSPITAL

RUPTURE OF THE RECTUS MUSCLE

A NUMBER of cases have been reported of rupture of one or both of the recti abdominalis muscles, although it is not of very common occurrence. This patient, a Greek laborer, age thirty-eight, was sent into the Atlantic City Hospital suffering with an excruciating pain in the abdomen. No personal or family history could be obtained as he could not speak the English language. He was a well-developed man of exceptional physique, presented a temperature of $100\frac{4}{5}°$ F., an anxious expression, a facies of pain. There was a swelling over the location of the left rectus muscle $1\frac{1}{2}$ inches below the umbilicus, exquisitely tender to the touch, but no discoloration. He went to work perfectly well, but after lifting the end of a heavy beam he was seized with a pain in the abdomen so severe that he fainted.

A perpendicular incision was made over the left rectus at the site of the swelling. Underneath the sheath of the rectus was found a large hematoma. The muscle was ruptured, with frayed ends. The blood-clots were turned out and the surface sponged out with hot normal saline solution. The ends of the muscle were trimmed and three mattress-sutures of catgut so placed as to approximate them. A wick of drainage was placed underneath the muscle and the incision closed. Recovery was smooth and unaccompanied with incident.

LARGE OVARIAN CYST

MRS. L. S., age sixty-two, Swedish, came in eighteen miles from the country. On admission she presented a weak and feeble pulse, cyanotic, and so dyspneic that she was gasping for breath. The house surgeon did not think she would live to get up stairs. She stated that the abdomen had increased in size very rapidly during the past year. Her health has always previously been good. She does not remember ever having been sick before. Her periods have always been normal until twelve years ago, when she passed the menopause. Her heart sounds are clear and normal, but rather feeble. The lungs, kidneys, and other organs present no pathology. The phthalein kidney function test is 30 per cent. The blood shows 70 per cent. hemoglobin, 3,840,000 reds, 8800 whites, 69 per cent. polys., and the blood Wassermann is negative. She has considerable difficulty in breathing and her abdomen is of enormous size, very tense. Its surface presents many bluish veins.

The differential diagnosis between ascites and a large cyst of this kind is one of the most difficult in abdominal surgery, because the typical signs with regard to the areas of dulness and tympany are more or less obscured. However, the center of the abdomen stands up more prominently in a cyst and there is less flattening in the flanks than in ascites. To me one of the most valuable signs, which I have not heretofore seen described, is to place the ulnar side of the left hand deep under the sternum transversely. With counterpressure from below with the right hand over the tumor, the fundus of the cyst can be outlined from above as a distinct and more or less movable mass. A large quantity of free fluid in the cavity, as in ascites, would not give any distinct outline from above. The fact also that there is no disease of the heart, kidneys, or liver corroborates my belief that this is a large cyst.

In the early days of abdominal surgery large cysts of this

nature were not uncommon. One rarely sees them now because they are diagnosed earlier in their course and when smaller, and they reach the surgeon before they attain such size. I shall carefully make a midline incision. On reaching the peritoneum I find that it is adherent all over the front of the tumor. I separate the peritoneum from it for some distance in every direction. It is probable, however, that a cyst of this nature so adherent anteriorly is also adherent posteriorly, no doubt involving all of the abdominal viscera. I feel sure the effort to free it from everything in the cavity will probably result in a fatal outcome to the patient. I will therefore empty this cyst with a large trocar.

As a rule, it is best, in all cysts of the ovary in women past the menopause, to deliver them and remove them without rupture if possible, since a very large proportion of them at this age are malignant. In this case, however, that will be impossible. Fifty-four pints of a chocolate-colored fluid were withdrawn and sections of the cyst wall were removed for study.

On examining the collapsed walls of the empty cyst, which is unilocular, it is apparent that throughout its posterior surface it is densely adherent to all of the abdominal structures lying behind it. Our best judgment is not to attempt to remove it. We will swab out the whole cavity of the cyst with pure carbolic acid in order to destroy its secreting membranes and pack it with plain gauze.

Subsequent course: Patient reacted well from the operation, circulation became normal, color good. Every third or fourth day the cavity was wiped over with carbolic acid and packed. It rapidly diminished in size and finally closed completely. Her recovery was uneventful and smooth. Discharged in six weeks and has remained well for more than two years.

Pathology: Gross appearance, a piece of membrane irregularly thickened, serous surface smooth, inner surface glistening and ecchymotic.

Microscopic: Serous surface shows a compact fibrous layer beneath which an irregular formation of fibrous and occasional strands of elastic tissue can be seen. Aggregations of lympho-

cytes, suggesting tubercles, could be seen. Capillary proliferation is present, wandering cells and leukocytes, and also areas of hemosiderin deposits. Inner layer presents appearances of a loose areola texture showing vacuoles and what seem to be lymph spaces.

ABORTION

ABORTION is an occurrence as old as the human race. It is the most frequent operation in every hospital in the world with the exception perhaps of tonsillectomy. Every hospital is burdened with the number of abortions that it has to take care of. It is a regrettable fact in these days of knowledge that a majority of them are induced either by the patient herself, or at the instance of some one whom she calls to her aid, including midwives, nurses, and crooked members of the medical profession.

Notwithstanding this age-old occurrence the enormous numbers of abortions in the aggregate in a single year and the volumes that have been written on the subject, there seems to be as yet no agreement in the profession as to how it should be handled. At one extreme are the watchful waiters, who advise letting the patient absolutely alone, expecting nature to expel everything and relieve the patient. At the other are those who would curet at once every patient. The only type of case in which there is uniform agreement is that with dangerous hemorrhage, and here the uterus should be promptly emptied.

I have never been able to get my consent to allow a patient to go on with a foul stinking mass of necrotic placental material remaining in the uterus from day to day inviting septic infection, subinvolution of the uterus, and possible destruction of the appendages, if not general septicemia. The practice in the Atlantic City Hospital may be divided into four types and stated definitely as follows:

1. Patients with excessive hemorrhage must have the uterus emptied at once.

2. Patients with a temperature which comes on coincidently with the abortion as a sort of reaction temperature should have the uterus promptly emptied.

3. Patients who have become sapremic with temperature of a mild nature which has come on after a few days following an

abortion should wait until the temperature has subsided and then have the uterus emptied.

4. Patients who come into the hospital having had one or more severe chills, a high fever (105° F. or more) and looking very sick should have the uterus very gently explored, and if retained placenta is found, it should be very gently lifted or wiped out.

In our experience Type 4 is the only kind of abortions that give us any real anxiety, since they have already acquired a severe degree of septic infection which has spread beyond the confines of the uterus itself. The type of infection is usually a virulent streptococcus. Oftentimes the uterus will be found to contain nothing, but if there should be a mass of placenta present, is it good judgment to leave it there to act as a focus to continue the flooding of the system with bacteria and poison the patient? To remove the mass often results in improving the condition of the patient, although sometimes the infection has progressed to such an extent that in spite of anything that can be done she will be overwhelmed by a general septicemia and die. It is in this type of case that a massive dose of antistreptococcic serum if given at the very outset will sometimes produce an almost miraculous result, but it must be given at the outset. If given later it will be of no benefit whatever.

In the treatment of all abortions it is not so much what you do as how you do it. The sharp curet should never be used. A dull irrigating spoon or the type of instrument devised by Hirst, of Philadelphia, may be used. There should be no attempt at scraping the endometrium. Only enough pressure should be used to dislodge the mass and bring it out. If the case be of the septic type, the placenta should be gently picked out with forceps or wiped out with a piece of gauze wrapped about the finger or a dressing forceps. As little instrumentation as possible should be indulged in, and this applies even to dilating the cervix. The surface of the endometrium should then be wiped over with equal parts of iodin and carbolic acid and a strip of iodoform gauze packed into the uterus. The method of Ill, of Newark, of packing the uterus with plain gauze saturated with 95 per cent. alcohol is also of value and gives good results.

The mortality from abortion in this clinic is practically nil under the management as outlined above. In Types 1, 2, and 3 the temperature is normal the next day, and the case is discharged in a week well and without subsequent morbidity. An occasional case presents itself suffering from neglected and severe septicemia of Type 4, in which no treatment will succeed, for it is too late.

The excellent results attained are, I believe, due to the fact that each case is shaved or close clipped, and prepared as carefully as if an abdominal operation was to be done. The vagina and vulval regions are painted with the standard picric acid solution, and whatever instrumentation there is, is of the gentlest type.

Our experience is that nature very rarely expels everything with an abortion. The only cases in which it does are those in which the unruptured sac containing the fetus and placenta comes away intact. Otherwise even when the uterus seems to be empty, the curet will bring away many small masses of placental tissue. If these are allowed to remain there will ensue more or less morbidity exhibited in subinvolutions, placental polyp, salpingitis, or continued bleeding after the patient has resumed her activities. This sends her back to the hospital for the curetment she should have had when she was there. There is no operation in gynecology that requires a nicer touch, a wider experience in handling, and a better judgment in individualizing each case than the management of abortion.

A CASE OF ABDOMINAL PREGNANCY

TRUE abdominal pregnancy is not so common that any one man's experience with it reaches very far. Each case presents certain features of interest. This one is a good example of some of the difficulties in diagnosis that some abdominal conditions present. She was first admitted to the medical department and was studied very carefully, but no diagnosis was arrived at. She then came in to the surgical ward because her symptoms suggested gall-bladder trouble. After going through further examination it was decided to refer her to the gynecological ward. Up to this time no diagnosis had been made.

The patient was a colored pantry maid of rather small statue and slight build. She is married and twenty-seven years of age and has borne one child, but has had no miscarriages.

Her family history is negative, father, mother, brothers, and sisters all living and well. She has had a few of the diseases of infancy. She began to menstruate at thirteen years of age. Her menses have never been very regular, sometimes appearing twice in the same month. There is no pain and the flow is normal. Her appetite and digestion are good, bowels regular. She has no urinary symptoms, but infrequent backache and headache. She has a yellowish leukorrhea. She says she was taken sick about two weeks ago with pain in the right epigastric region, vomiting, and some fever. She thinks she is pregnant.

On examination, her eyes, ears, teeth, and mouth are in very good condition. Her chest sounds and heart are normal and show no pathology. The extremities are normal. In the region of the gall-bladder can be felt a mass which is somewhat tender on palpation. Her pelvic organs show ā very slight softening of the cervix and a little enlargement of the uterus which is movable, but does not present the signs of pregnancy. There is nothing to be felt in the left pelvis and only some induration and thickening on the right side. Her urine is turbid, straw color. Specific gravity 1010, neutral in reaction. There is no albumen, sugar, or

indican, but a double plus acetone and slight amount of diacetic acid. No crystals, 25 pus-cells to the field, and a granular cast.

In this clinic we do not consider that a voided specimen of urine from any woman is of any diagnostic value. No woman can void urine without some contamination which usually shows albumen to some extent and some pus-cells. All specimens, therefore, must be catheterized specimens.

Fig. 544.

The blood examination first made showed 3,850,000 reds, 17,800 leukocytes, 63 per cent. hemoglobin, and 80 per cent. polyneutrophils. A week later there were 3,960,000 reds, 25,600 leukocytes, 70 per cent. hemoglobin, and 96 per cent. polyneutrophils. There was no alteration in size, shape, or staining qualities of the cells, but it is interesting to note that the leukocytes have risen from 17,800 to 25,600 and the polyneutrophils from 80 to 96 per cent.; the blood Wassermann was negative.

The *x*-ray examination of the abdomen reveals a mass up under the liver, and by careful inspection there seem to be the evidences of fetal ribs if you study the plate long enough. The diagnosis we have made is abdominal pregnancy. I shall now make an upper abdominal incision a little to the right of the midline. Here you will see a diffuse mass lying just below the liver. As we find a line of cleavage under it and lift it up and trace it down it is seen to be a very much distended and elongated fallopian tube apparently filled with an old blood-clot. Underneath this I find a fetus of about four and a half months, dead and macerated. This mass under the fetus is the placenta. It is attached to the transverse colon, liver, and gall-bladder. As a rule, the safest thing to do with a placenta under these circumstances is to let it alone, pack the cavity with gauze, and let it come away by itself. However, in lifting the edge of it, it seems almost ready to separate itself and does not bleed much. I am able to remove it with very little hemorrhage, which is fortunate. We will now take out the enormously distended tube. I shall only partially close the abdominal wound and pack the cavity with iodoform gauze.

Subsequent history: Patient made an uneventful recovery; discharged in four weeks in excellent condition.

SUPRAVAGINAL HYSTERECTOMY

THIS patient presents a tumor mass reaching nearly up to the symphysis pubis. She is thirty years of age and is a colored woman. The frequency of fibroid tumors is well known among negroes. There are very few colored women who reach the age of thirty or forty years who are without myofibromyomata of varying sizes. This patient states that she has always enjoyed good health. She had measles and pertussis when a child, but has had no other illnesses. Her weight is 130 pounds. She is well developed, has never been pregnant, and her heart, kidneys, lungs, and other organs are normal. She menstruates regularly without metrorrhagia or menorrhagia, the periods lasting four to five days, but dark in color. Her blood Wassermann is negative, she is slightly anemic. The phthalein kidney function test is 28 per cent. for two hours. In this clinic we make it a routine in all these cases to determine the kidney function. We find it useful in determining when to operate as well as useful in the prognosis.

A long median incision will now be made. As the tumor comes into view it is observed that the largest tumor of the mass is pedunculated. You will also observe that the omentum is spread out over it, and here is a mass of tortuous omental veins, some of them as large as a lead pencil, which are feeding the tumor. That indicates that the circulation in the pedicle of the tumor is becoming inadequate to supply it and that the omentum has taken up the function of the nutrition of the tumor. Such cases are rather rarer than they formerly were because most of these cases are discovered earlier and come to operation before this occurs. The omental veins are carefully ligated and the omentum separated from the tumor. It is very important to see that hemostasis is complete. The omental veins have no valves and the smallest vessel may bleed until the patient is exsanguinated. As I bring the tumor mass up it will be noticed

that there are many old and strong adhesions holding it fast in the pelvis. We separate them or dissect them loose. It is very important, in our experience, to see that the mass with its appendages is completely free and movable before attempting its removal or it may be embarrassing at a later stage of the operation. It is now free and we deliver the whole mass out of the incision. Long curved clamps are placed on both broad ligaments. A centimeter above these are placed smaller clamps and we cut with an angulated flat-bladed scissors between the clamps. The round ligaments which have been clamped are now severed. An incision is now made across the anterior of the fundus at the bladder white line and the bladder pushed down. Heavy clamps are now placed on each uterine artery and the tumor mass with its tubes and ovaries is ready for removal. There is no danger of injury to the ureters because with the mass thoroughly freed and pulled up the ureters are well below the grasp of the clamps on the uteriene arteries.

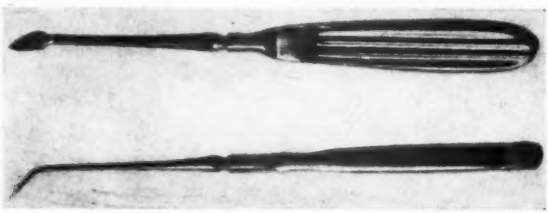


Fig. 545.—Hysterectomy knife.

The author's hysterectomy knife is now used to make an incision both on the anterior and the posterior surfaces of the cervix. My reason for devising this knife was the difficulty experienced in making dissections of the uterus deep in the pelvis with a straight knife or scissors. Its main usefulness is in those cases in which the pelvis is small, with low posterior fibroids of the uterus which almost fill the space between the uterus and the sacrum, or in like fibroids anteriorly under the pubic bone where the space is small and the uterus immovable. It is often difficult to get under the tumor with a straight scalpel and make

a clean supravaginal amputation of the uterus. With this angulated knife the performance becomes simple and easy. It is also most useful in severing the uterosacral ligaments posterior to the uterus in certain panhysterectomies and in amputating the upper vagina when the parts are fixed and the space is small. This removes a wedge-shaped mass. The knife is particularly useful when fibroids are situated low down either in front under the pubis, or posteriorly, when there is little space between the tumor and the promontory of the sacrum. The mass is now removed and weighs 12 pounds. In such a case as this it would be impossible to retain the ovaries because they are all tied up in the mass and covered over with inflammatory adhesions. The anterior and posterior lips of the wedge-shaped incision across the cervix are now united with three catgut sutures which are held long as tractors and close off the cervix, making it extraperitoneal. We have never found it necessary with this technic to cauterize or treat the exposed cervical canal. No infection has ever occurred by its omission. The uterine arteries are now ligated, the round ligaments tied, and lastly the tubo-ovarian arteries. A long running suture is now started on the right side uniting the layers of the broad ligaments, bringing the bladder fold down over the cervical stump and continuing around the left side, bringing together the layers of the left broad ligament. The round ligaments are now sewed into the cervical stump and the operation completed. It will be seen that the field is now perfectly clean and perfectly peritonealized. The appendix was removed and the incision closed.

The subsequent history shows an uneventful course; the postoperative rise of temperature was 100° F., and the patient discharged well on the fifteenth day.

PELVIC OR ECTOPIC KIDNEY

THIS case is interesting because of some rather unusual features. She is an unmarried female thirty-eight years of age. Her father died of hemiplegia, her mother is living. She says she has never been sick except for an acid indigestion. Her weight is 120 pounds. She has an occasional headache, no backache, is constipated. Her heart and lungs present no abnormalities. Her urine is normal, blood Wassermann negative.

The menstrual periods appeared at the age of twelve. They have been regular, coming a little in advance of the twenty-eight-day cycle, and always associated with dysmenorrhea. She flows rather freely and for the past year or two has suffered with a severe menorrhagia. She has to go to bed, and at times the hemorrhage is so severe as to seriously deplete her blood. The vagina and cervix are normal, but the uterus is small in size and hard. She underwent an operation in another clinic three years ago, at which time the right tube was removed and the right ovary resected. She was told that she had no left tube or ovary.

In order to relieve her excessive flow *x*-rays were used. Six or seven exposures were made. This, instead of relieving the condition, rather aggravated it. We will therefore do a hysterectomy. On opening the abdomen the uterus is seen to be hard and small, almost infantile in type. The right tube has been removed and the right ovary implanted in the cornua. There is no tube attached to the left cornua, which presents a smooth rounded appearance. Over on the left side skirting the rim of the pelvis is to be seen a tube normal in size and a rather shriveled ovary. Attached to the proximal end of this tube is a cord-like structure somewhat enlarged at its upper end, and between this and the uterus proper the border of the broad ligament, which is the only connection it has with the uterus proper, is smooth and even. The two structures are separated by at least $3\frac{1}{2}$ inches. This is evidently the vestige of a secondary uterus. Malforma-

tions of the uterus result either from faulty or incomplete fusions of, or from arrested development of, the ducts of Müller. In the uterus didelphys the uterus is composed of two completely separated uterine halves, each half having its tube and round ligament. In the present case the right half developed into a functionating uterus, but the development of the left half was arrested and remained only a vestige, although its corresponding tube was developed to a normal size. It is rather extraordinary that these two structures should be so widely separated.

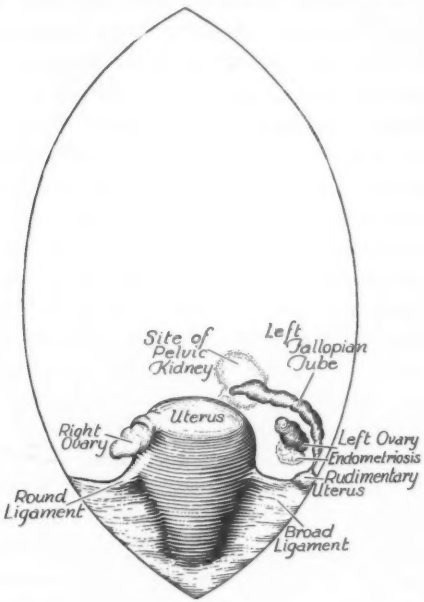


Fig. 546.

There is a mass here at the left of the rectosigmoid junction. It does not seem to be inflammatory in character. The peritoneum slides easily over it. On opening the posterior peritoneum the mass is seen to be a kidney, somewhat undersized. It is a true case of pelvic or ectopic kidney. Pelvic kidney does not mean the ptosis of a normal kidney, but is considered to be

congenital. The cause of pelvic or ectopic kidney is a lack of or arrest of the ascent of the kidney in fetal life. It is more often found in females than males, and more often to be found on the left side. It is also true that it is frequently associated with malformations of the genital organs and disturbances of the menstrual functions.

The location of this kidney in this position offers an explanation of the character of the pain from which the patient has suffered as told in her history. She states that, especially at times when she is at stool, she is seized with a severe pain while defecating which is severe enough to cause her to faint.

Efforts have been made to elevate and fix ectopic kidneys by doing a nephropexy. As a rule, it is unsatisfactory. In this case the ureter is short, not over 4 inches in length. It is not long enough to justify any attempt to fix the kidney. Since she possesses a good kidney on the right side and her phthalein function test is above 50 per cent., we will remove this kidney.

The following is the pathologic report of the pathologist, Dr. Robert A. Kilduffe:

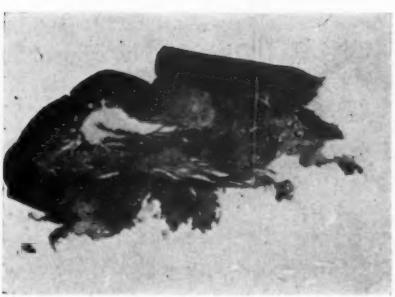
The tissue found adjacent to the ovary is of considerable interest inasmuch as no histologic classification can be found for it.

Pathologic report of tissue specimens from M. S. (Dr. Darnall):

The specimens as received in the laboratory August 5, 1926, in the absence of the pathologist, were recorded as follows: (*a*) An ovary which has been sectioned in the operating room; (*b*) a fallopian tube measuring 7.5 cm. in length; (*c*) a kidney measuring 9.5 by 5.5 cm. which has been sectioned in the operating room; (*d*) a uterus measuring 6.5 by 4 cm.

Gross description: The uterus contains multiple subserous fibroids some of which show evidence of degeneration and necrosis.

The kidney is somewhat sclerotic, though the capsule strips easily, leaving a relatively smooth surface. The cortex is approximately one-third the width of the medulla and there appear to be but *four pyramids*.



Figs. 547–549.—Low-power microphotograph showing general contour and gross character of mass of tissue (endometriosis).

The tube presents the appearance of marked congestion and is adherent to the ovary. At one pole of the ovary is a small, rugose mass of tissue, elliptoid in shape. While seemingly firmly fused to the ovary and continuous with rather than contiguous to the ovarian tissue, this portion is grossly different in color, consistency, and appearance.

Sections were made of this portion after formalin fixation.

Microscopy (Dr. Kilduffe): Sections from various areas show a very irregular and conglomerate picture. Various histologic elements are seen without any definite or orderly arrangement. The predominating structures are muscle, mucous glands, and rather numerous small blood-vessels, the walls of which at times are somewhat thickened.

There is a definite amount of fibrous connective-tissue stroma.

The tissue does not resemble ovarian tissue, nor can it be definitely classified histologically other than to say that it is probably aberrant. In all likelihood it is of uterine origin and represents an endometriosis.

Subsequent History.—The patient made an uneventful recovery with the exception of a small hematoma which formed under the line of the incision.

CLINIC OF DR. ABRAM B. ABRAMS

NEWARK BETH ISRAEL HOSPITAL

SALIVARY CALCULI

Case I.—Mrs. E. K., aged sixty, married, housewife.

Chief Complaint.—Swelling of the floor of the mouth and glands of the neck. Pain on mastication and on swallowing.

Past History.—For the past eighteen years the patient has complained of periodic swelling of the floor of the mouth accompanied by pain and discomfort. This would clear up in two or three weeks and recur at frequent intervals.

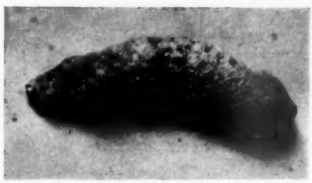


Fig. 550.—Case I. Stone after removal from lingual duct (actual size).

Physical Examination.—Examination of the mouth shows a few carious teeth and some roots in the lower jaw. All teeth in the upper jaw removed. There is a painful swelling in the floor of the mouth beneath the tongue about the size of a horse chestnut. A slight oozing of pus from the lingual duct is visible. Bimanual examination reveals a hard mass, very tender, and on pressure pus exudes. By passing a probe into the lingual duct a hard mass can be distinctly felt. Under local anesthesia a careful incision is made over the lingual gland beginning at the orifice of the duct. The stone is exposed and easily removed.

The stone is about $3\frac{3}{4}$ cm. in length and about 1 cm. in diameter. The swelling and induration disappeared within a short time, and patient made a full recovery within ten days (Fig. 550).

Case II.—Mr. C. R., aged thirty-four, salesman, single.

Chief Complaint.—Pain and swelling in the floor of the mouth. Painful mastication.

Past History.—Negative.

Physical Examination.—Examination shows the floor of the mouth markedly indurated, with inability to raise the tongue. A large mass about the size of a plum is felt. Marked induration about the orifice of the lingual duct. No flow of saliva on pressure. Probe passed into the duct and a hard mass is felt.

Fig. 551.—Case II. Stone after removal from lingual duct (actual size).

Surgical Procedure.—Same as in the preceding case. The calculus was crescent in shape, about $4\frac{1}{2}$ cm. in length and $1\frac{1}{2}$ cm. in diameter, and apparently had a canal running through its length. This canal seems to have been obliterated (Fig. 551).

Case III.—J. L., aged seventeen, clerk, female.

Chief Complaint.—Swelling underneath the tongue for the past six months. No pain or discomfort.

Past History.—Negative.

Physical Signs.—Hard swelling, size of a lima bean, can be felt in an area of the lingual duct. *x*-Ray examination shows a round shadow with a radioparent center measuring almost $1\frac{1}{4}$

cm. in diameter (Fig. 552). Operation to be performed at later date.

Discussion.—Salivary calculi or sialith occur in the cystic dilatation of the salivary glands. They usually form about foreign bodies or mouth fungi (Leptothrix buccalis) which have accidentally passed into the ducts. Very often a predisposing cause is arthritic diasthesis or mercurialization.

The stones usually consist of calcium carbonate and phosphates and rarely inspissated saliva. The shape of the stones usually correspond to that of the ducts in which they are formed and often are branched. Richter reports one that weighed 34 grams, and Hulke, one that weighed 67 grams. The latter had

Fig. 552.—Case III. Stone in lingual duct before removal.

a nucleus from a splinter of wood. The most frequent site for salivary calculi is in the submaxillary gland. Next in frequency comes the parotid, and least of all the lingual gland.

The symptoms vary somewhat. As in the first case presented, some patients have periodic attacks of pain and discomfort in the area of the gland involved, which disappears and reappears at intervals, and during the intervals they are apparently in normal health.

In the second case there is marked pain on mastication, especially when food of an acid nature is eaten.

Still others show no symptoms at all until the duct and gland becomes infected and marked induration and inflammation takes place. The diagnosis is made by *x*-ray, digital exam-

ination, and the introduction of sounds into the duct or gland. The condition may be accompanied by induration of the gland with inflammation, suppuration, and sometimes cystic formation. Complications are rare in calculi of the sublingual gland due to the many excretory ducts (Rivinus). The treatment is purely surgical.

CLINIC OF DR. BERNARD H. GREENFIELD

NEWARK BETH ISRAEL HOSPITAL

INTESTINAL OBSTRUCTION

THE management of a case of acute intestinal obstruction presents many complex problems that are not easily solved. The diagnosis is not always easily determined. There are a number of diseases that fall within the domain of acute abdominal pathology that may simulate intestinal obstruction, for example, renal colic due to calculi, acute appendicitis, acute perforating ulcer of the stomach and upper intestinal tract, pancreatitis, gall-bladder disease, and ovarian cyst with twisted pedicle. It is therefore of utmost importance that a complete history be taken, urinalysis and other clinical data obtained; and if the patient's condition permits, *x*-ray or fluoroscopic examination be made. The following are the most common causes of obstruction: strangulated hernia, volvulus, intussusception, intestinal paralysis due to peritonitis, fecal impaction, postoperative adhesions, adherent appendix, adherent Meckel's diverticulum, foreign bodies and intestinal parasites, biliary calculi, tumor of the intestinal wall, venous or arterial embolus, and thrombosis of the mesentery.

After the diagnosis has been established and operation decided upon, the question as to the appropriate procedure in a given case is a rather intricate one. The tendency on the part of some surgeons—which is most laudible under certain circumstances—is to know all that can be determined as to the cause of the obstruction, whether it is due to a growth or bands of adhesions, etc. This effort of getting at the fundamental cause of the condition may be carried to extremes, particularly

ination, and the introduction of sounds into the duct or gland. The condition may be accompanied by induration of the gland with inflammation, suppuration, and sometimes cystic formation. Complications are rare in calculi of the sublingual gland due to the many excretory ducts (Rivinus). The treatment is purely surgical.

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in cases where the obstruction is of long duration, or where the general condition of the patient is such that prolonged exploratory manipulations or radical surgical procedures may and very frequently do jeopardize the life of the patient. It is very often advisable to do a little less, although it may not be theoretically correct, than to perform an operation that conforms with the modern surgical teachings, which entail a great risk to the life of the patient. One must bear in mind that patients suffering from intestinal obstruction, particularly of moderate or long duration, are very serious surgical risks. They even sometimes are more ill than they appear to be. In the late stages of the disease the toxemia is so overwhelming to the patient that it produces a certain sense of comfort and blunting of sensibility to such an extent that the patient's apparent reaction to his disease is not in direct proportion to the extent of the pathology found in the abdomen.

Three of the cases included in this group clearly demonstrate the advisability of conservative treatment of certain types of intestinal obstruction. We feel that if radical procedures would have been adopted, the ultimate results might not have been as favorable.

Case I. Hirschsprung's Disease.—S. G., male, aged twenty-five; Roumanian, white; telegraph clerk.

Chief Complaint.—Pain in abdomen, nausea, constipation, and vomiting.

History.—During childhood he suffered with chronic constipation. One year ago had an attack of obstipation accompanied by severe pains lasting a few days.

Laboratory Findings.—Urine showed a trace of glucose, otherwise negative. Blood-count 24,000, leukocytes, 94 per cent.; polynuclears, 6 per cent.; lymphocytes, hemoglobin, 83 per cent.; pulse 72; temperature, 97$\frac{4}{5}$° F.; respiration 22; blood-pressure, systolic 142, diastolic 74.

Present Illness.—The patient was constipated two days before admission. Generalized pain over the abdomen with distention. Took some cathartic pills for relief, without any effect.

Next day felt slightly better and went to work. The following afternoon had to leave work due to severe colicky pains over the entire abdomen. Took a dose of Epsom salts, without any effect. He was also give a few enemas on the advice of a physician. Patient began vomiting and continued to do so up to the present time.

Physical Findings.—The abdomen is uniformly distended. On palpation we find entire abdomen somewhat tense and doughy, with very marked distention over entire epigastric and both hypochondriac regions, more marked toward the left. Liver dulness is entirely obliterated, with marked tympany over the entire area. Judging from the past history of the case, which is of long duration, it strongly suggests chronic intestinal pathology, and from the present history of sudden onset of pain, constipation, and vomiting we may arrive at a diagnosis of intestinal obstruction. There is no history of any previous abdominal infection or surgical operation which may have produced adhesions causing this obstruction. The marked upper abdominal distention, which corresponds with the course of the transverse colon, with the history of persistent obstipation since childhood, strongly suggest Hirschsprung's disease as the cause of this patient's condition.

Surgical Procedure.—Midline incision from ensiform to slightly below umbilicus. Peritoneal cavity opened; markedly distended colon protruded out of wound, the distention involving the transverse, descending, and sigmoid colon. The colon is about 5 inches in diameter, wall very thick, congested, and feels leathery. It is impossible to explore the abdomen any further on account of the marked distention of the gut. We will therefore do a colostomy to allow the gas and contents to escape and cause the bowel to collapse. This procedure will not only enable us to inspect the general condition of the intestinal tract in this area, in order to discover the cause of the obstruction, but will also permit the bowel to regain its function in due time. We find the appendix, the cecum, and ascending colon normal. There is no volvulus tumor or band of constriction to account for the obstruction. In acute obstruction the

walls of the intestines are usually tense, tender, and very thin. In this case, although the colon is markedly distended and tense, the walls are greatly hypertrophied and feel leathery. These findings confirm our diagnosis of megalocolon or Hirschsprung's disease. Some surgeons, no doubt, would be tempted to perform the radical operation, which, as you know, is colectomy, but in this case, with the patient in such a weakened and highly toxic condition, we are not justified in performing so serious an operation. We will, therefore, do no more than the colostomy. However, should this patient suffer a recurrent attack, colectomy would be indicated. A large rubber tube is inserted into the opening of the colon and held in place by two purse-string sutures. The gut will now be fixed to the abdominal wall at the longer angle of the wound. Cigarette drain is placed alongside of the tube and abdomen closed.

Postoperative Course.—First and second day he complained of very little pain. Slightly restless; feces passed through tube. General condition fairly good. No distention.

On the third day after operation general condition fairly good; urine negative.

On fourth day drain removed.

On the seventh day patient had a normal bowel movement, with some feces passing through the tube.

The following day the colostomy tube was removed. Patient out of bed and discharged on the twenty-fifth day.

Follow-up.—One year later patient admitted to the hospital with an attack of obstipation which was not accompanied by vomiting or distention. After several high colonic irrigations he was relieved and was discharged on the fifth day. No operation performed.

Two and one-half years after operation patient feels well and has very little trouble with bowel movements.

Case II.—I. K., female, aged nineteen; white; bookkeeper.

Chief Complaint.—Marked distention of the abdomen accompanied by generalized cramp-like pains and constipation for the past three weeks.

Past History.—Typhoid fever at the age of seven. Complete recovery; no complications. Appendectomy three weeks ago.

Present Illness.—Began with acute pain in the lower right quadrant three weeks ago, which lasted for two days. Diagnosis of appendicitis was made and she was operated on in another hospital. Distention became noticeable twenty-four hours after operation, abdomen gradually increasing in size. After the first week she vomited continuously. Constipation became more marked, although enemas were frequently given, some of which were moderately effectual. For the past two weeks, although the vomiting has somewhat decreased and she had an occasional bowel movement, cramp-like pains are increasing in intensity and the distention is more marked. She had no bowel movement and no flatus expelled during the last forty-eight hours.

Laboratory Report.—Urine negative. Blood-count 13,600; 82 per cent. polynuclears, 75 per cent. hemoglobin. Wassermann negative.

Physical Findings.—This patient appears acutely ill. She is very dyspneic. The abdomen is markedly distended and tense. The skin from the breast down to the pubis is cyanotic. Generalized tympanitis. Liver dulness obliterated. Freshly healed right rectus scar noticed in the lower right quadrant. On deep pressure there is tenderness in the left lower quadrant.

Diagnosis.—From the symptoms and clinical history of this patient it is obvious we have a case of a slow, but progressive onset of intestinal obstruction the cause of which may be either a band of adhesion due to the former operation, volvulus, hernia into the mesentery, paralytic, ileus, or a hernia in an unnatural opening in the broad ligaments. Diagnosis of obstruction is so evident and condition of patient is so poor no *x*-ray examination was made.

Operation carried out under spinal anesthesia. An incision is made slightly to the left immediately below the umbilicus. On opening the peritoneum we notice a markedly distended colon which protrudes through the wound. This is congested and tense. In order to facilitate further exploration, and to determine the site of obstruction, we will empty the contents

of this large and distended gut by first inserting a double purse-string suture and inserting a large rubber tube and draining out its contents. Now that the bowel is collapsed, we are able to explore the lower abdomen with ease. Where the obstruction has taken place, we find a loop of colon twisted. We are able to bring it into view, and you will notice that there is a volvulus in the lower part of the descending colon and sigmoid. The untwisting of the volvulus is a very simple procedure. We also notice that there is generalized visceroptosis. The transverse colon is at the brim of the pelvis; this may be the cause of the volvulus. There are two types of volvulus: first, that in which the intestine rotates upon its long axis; second, that in which the loop of the intestine is twisted in much the same manner as a handkerchief used in a tourniquet. The former is usually seen in the ascending colon, probably due to the short mesentery. The latter is chiefly seen in the sigmoid flexure.

It is very important to anchor the gut in some manner in order to avoid a recurrence. In this case we will attach the descending colon to the parietal peritoneum at the site of the colostomy. A Mikulicz gauze drain is inserted alongside of the colostomy tube. Drain will be removed within twenty-four hours.

Postoperative Course.—Twenty-four hours after operation the reaction is very good. Patient has had three bowel movements through the tube. No distention. Temperature 103° F.

On the third day had several normal bowel movements. Temperature $100\frac{4}{5}$° F.; pulse 90; respiration 20.

On the fifth day the colostomy tube was removed. The wound healed, and on the twelfth day fistulous opening was closed.

On the fourteenth day after operation patient was discharged perfectly well.

Case III.—N. S., male, aged twenty-three; Russian, white; laborer.

Chief Complaint.—Abdominal cramps, constipation, and vomiting.

Past History.—Habitually constipated and occasional attacks of cramps lasting about an hour.

Present Illness.—The onset was sudden with an attack of severe pain in the lower left quadrant, gradually spreading over the whole lower abdomen. An enema was taken, but was ineffectual. Pain immediately became more severe, accompanied by vomiting. This continued until the following day, when he was admitted to the hospital.

This patient appears to be acutely ill. He seems to have intermittent severe cramps with a fair degree of comfort between the attacks. Tongue is dry and heavily coated. The abdomen is markedly distended. Peristalsis present, somewhat violent in character, accompanied by severe pain. Outstanding loops of gut are visible. He has marked tenderness in the left lower quadrant. Temperature 100° F.; pulse 104, and respiration 20.

Laboratory Findings.—Urine negative. Blood-count 9600; 74 per cent. polynuclears; 22 per cent. lymphocytes, and 77 per cent. hemoglobin. Fluoroscopic examination after barium enema shows an obstruction to the flow about the middle of the sigmoid.

Incision is made below the umbilicus a little to the left of the midline. Sigmoid and ascending colon are markedly distended. On exploring the lower abdomen a volvulus is found at the junction of the sigmoid and rectum. No difficulty is encountered in untwisting the gut. After doing a colostomy the bowel is emptied of its contents through the tube. The colon is attached to the parietal peritoneum at the colostomy opening. One cigarette drain is inserted alongside of the colostomy tube and the wound is closed in layers.

In this case, as in the previous one, a recurrence of the volvulus is prevented by having anchored the colon to the wall of the abdomen.

Postoperative Course.—At the end of the second day fecal matter discharging freely through the tube. Drain removed, distention diminished.

On the fifth day colostomy tube fell out. Patient having natural movements of the bowel.

On the thirteenth day fecal fistula closed. Patient was discharged on the twenty-second day after operation.

Follow-up.—One year and eight months. Patient is well and has no intestinal symptoms.

Case IV. Intestinal Neoplasm.—Mrs. H. A., female, aged thirty-three, white, housework.

Patient was admitted to the hospital with a diagnosis of acute appendicitis. About three days ago this patient began to have pain in the right side of the abdomen which gradually increased in severity, associated with nausea and vomiting. Several enemas were given, with no result. On admission to the hospital the temperature was 99.2° F.; pulse 100; respiration 30.

Laboratory Findings.—Urine shows a faint trace of albumin. Blood-count 12,000; leukocytes: 79 per cent. polynuclears and 21 per cent. lymphocytes.

Physical Findings.—This patient appears well nourished. The abdomen is markedly distended. There is moderate tenderness over the entire abdomen, accentuated in the lower right quadrant. Now that the patient is under the anesthetic and her abdomen is relaxed, on palpation we find a mass about the size of a hen's egg in the upper right quadrant. This mass appears to be movable. These findings now make it appear that the diagnosis of acute appendicitis is incorrect, because if the mass were of an inflammable nature it would be fixed; although some of her clinical symptoms point to it, she no doubt has some concomitant condition. This patient has been vomiting continuously; this is very rare in acute appendicitis. They very seldom vomit more than two or three times. This mass is either a fecal impaction or a growth which is causing acute obstruction of the bowel.

Operative Procedure.—We will make a high right rectus incision. On opening the peritoneal cavity the cecum is somewhat distended; the appendix is slightly injected, but does not appear to be the cause of all the trouble. In passing the hand along the direction of the ascending colon a mass is felt within the bowel. We will first remove the appendix in the usual man-

ner. We are able to slide the walls of the colon upward and downward over the mass, while the mass itself remains stationary. We are unable to break this mass up, which is usually possible in fecal impaction. Undoubtedly this is a neoplasm and not a fecal impaction. The cecum is opened by making an incision parallel with its long axis. The tumor is about the size of a hen's egg with a pedicle about 9½ cm. in length and about 1½ cm. in diameter. The pedicle is attached at the margin of the ileocecal opening (Fig. 553). We will now remove this growth

Fig. 553.—Diagram, longitudinal section, showing tumor within the intestine; pedicle attached to margin of ileocecal opening.

at its attachment, making sure to remove part of the mucosa of the cecum with it in order to obviate any recurrence. The growth being removed, we will now proceed to bring the edges of the mucosa together with a row of plain catgut sutures, repair the opening of the cecum with three rows of sutures, and drain the peritoneal cavity with one cigarette drain.

Pathologic Report.—By Dr. Asher Yaguda.

Specimen: Appendix and tumor mass. Gross examination: Tumor. Firm pyriform mass measuring 8½ by 6 cm. at the base. The surface is smooth, green in color, and covered by a thin layer of feces. On section, the tumor cuts firmly and is seen to be composed of a homogeneous tissue which is smooth and yellowish-gray in color. There are many small hemorrhagic areas. The capsule is thin and firmly attached to the tumor.

Appendix: The serosa is smooth and slate-colored. The wall cuts firmly on section. It is thin and grayish in color. The mucosa is normal in appearance. The lumen is patent and contains a small amount of fecal matter.

Microscopic examination: Sections from the tumor of the intestinal wall show an edematous neoplasm in which the structures are widely separated by fluid. The predominating tissue is smooth muscle. Between the muscle-fibers many lymphocytes can be seen. The appendix shows chronic inflammatory changes. The mucosa is compressed and atrophic.

Diagnosis: Edematous fibromyoma. Chronic appendicitis.

Benign tumors within the intestinal wall are not very common. Several varieties of the non-malignant type may be found within the intestines. They are: lipoma, myoma, angioma, and lymphangioma. They may be sessile or pedunculated. They are usually small and cause no untoward symptoms. In this case the tumor was evidently slow in its growth, extending over a period of years, causing no other symptoms except occasional attacks of constipation. When the mass filled the lumen of the gut it caused the present condition of complete obstruction.

Postoperative Course.—On first day following operation patient had very slight distention. No vomiting. Pulse is very good. Very moderate reaction.

On the fourth day patient was able to pass flatus and had a bowel movement. General condition is very good.

On the fifth day the drain was removed. There was a slight superficial wound infection. Wet dressings were applied. Patient made an uneventful recovery and was discharged on the twenty-first day.

Follow-up.—Eighteen months after operation patient enjoying good health. No recurrence of symptoms.

CASE OF UTERUS BICORNIS UNICOLIS

B. Z., aged seventeen, Russian by birth, saleslady.

Patient is normal in size and weight.

Family History.—Negative.

Past History.—Irrelevant.

Menstrual periods began at the age of thirteen: regular, usual flow lasting four days, always accompanied by pain. This patient was admitted to the hospital with the history and clinical symptoms of acute appendicitis. After opening the abdomen the pelvic organs were examined to determine if possible the cause of the dysmenorrhea; it was then found that she had a bicornate uterus. Each horn is the size of a normal virgin uterus; the tube, ovary, and round ligament on each cornu is normal. The horns are separated at the supracervical region by a space about 1½ inches. The cervix is continuous with the left horn. The right horn ends abruptly and is in contact with the left one at the location of the internal os. On vaginal examination, one cervix, normal in size, with one orifice, can be seen through a speculum. The external genitals are normal.

This anomaly represents an effort of nature, so to speak, to form two separate uteri, but separation involves the upper section only. Fusion occurs in the lower or supracervical section of the Mullerian tract, but union is lacking above. As a congenital anomaly the bicornate uterus stands midway between the bifid and bilobulated uterus and the double uterus (uterus didelphys). Occasionally union extends beyond the cervical region and may reach as high as the fundus, the bicornate character of the deformity being suggested only by a simple fundal depression or notch. As regards the size of the two horns, they may be fairly normal and equal, as in this case, or unequal; or they may be rudimentary and equal or unequal. Generally there is a great variation in the separation of the two bodies.

In the most pronounced cases they are wide apart superiorly, as in this case.

With respect to the cervix, this may be single, with a single orifice (uterus bicornis unicolis), or it may be double, with two apertures.

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